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LED LCD TV SERVICE MANUAL

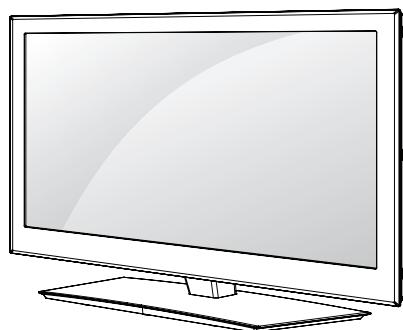
CHASSIS : LD12D

MODEL : 47LV770S

47LV770S-ZA

CAUTION

BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.



P/NO : MFL67002350 (1108-REV00)

Printed in Korea

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SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

1. Application range

This specification is applied to the LED LCD TV used LD12D chassis.

2. Requirement for Test

Each part is tested as below without special appointment.

- 1) Temperature: 25 °C ± 5 °C(77 °F ± 9 °F), CST: 40 °C ± 5 °C
- 2) Relative Humidity : 65 % ± 10 %
- 3) Power Voltage
 - : Standard input voltage (AC 100-240 V~, 50 / 60 Hz)
 - * Standard Voltage of each products is marked by models.
- 4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
- 5) The receiver must be operated for about 5 minutes prior to the adjustment.

3. Test method

- 1) Performance: LGE TV test method followed
- 2) Demanded other specification
 - Safety : CE, IEC specification
 - EMC :CE, IEC

4. Model General Specification

No.	Item	Specification	Remarks
1	Market	EU(PAL Market-36Countries)	<p>DTV & Analog (Total 36 countries)</p> <p>DTV (MPEG2/4, DVB-T) : 31 countries</p> <p>(England/Italy/Germany/France/Spain/Sweden/Finland/Netherlands/Belgium/Luxemburg/Greece/Denmark/Czech/Austria/Hungary/Swiss/Croatia/Turkey/Norway/Slovenia/Poland/Ukraine/Portugal/Ireland/Morocco/Latvia/Estonia/Lithuania/Rumania/Russia/Slovakia)</p> <p>DTV (MPEG2/4, DVB-T2): 5 countries (England/Denmark/Sweden/Finland/Norway)</p> <p>DTV (MPEG2/4, DVB-C): 10 countries</p> <p>Sweden/Finland/Austria/Swiss/Germany/Netherlands/Hungary/Slovenia/Norway/Denmark</p> <p>DTV (MPEG2/4,DVB-S): 31 countries</p> <p>Albania/Austria/Belgium/Bosnia/Bulgaria/Croatia/Czech/Estonia/France/Germany/Greece/Hungary/Ireland/Italy/Kazakhstan/Latvia/Lithuania/Luxembourg/Morocco/Netherlands/Poland/Portugal/Romania/Russia/Serbia/Slovenia/Spain/Slovakia/Switzerland/Turkey/Ukraine</p> <p>Analog Only - 5 countries (Bosnia/Serbia/Bulgaria/Albania/Kazakhstan)</p> <p>Supported satellite : 22 satellites</p> <p>HISPASAT 1C/1D, ATLANTIC BIRD 2, NILESAT 101/102, ATLANTIC BIRD 3, AMOS 2/3, THOR 5/6, IRIUS 4, EUTELSAT-W3A, EUROBIRD 9A, EUTELSAT-W2A, HOTBIRD 6/8/9, EUTELSAT-SESAT, ASTRA 1L/H/M/KR, ASTRA 3A/3B, BADR 4/6, ASTRA 2D, EUROBIRD 3, EUTELSAT-W7, HELIASSAT 2, EXPRESS AM1, TURKSAT 2A/3A, INTERSAT10</p>
2	Broadcasting system	1) PAL-BG 2) PAL-DK 3) PAL-I/I' 4) SECAM L/L', DK, BG, I 5) DVB-T 6) DVB-C 7) DVB-T2 8) DVB-S	DVB-S :Satellite

No.	Item	Specification	Remarks
3	Receiving system	Analog : Upper Heterodyne Digital : COFDM , QAM	<p>► DVB-T</p> <ul style="list-style-type: none"> - Guard Interval(Bitrate_Mbit/s) 1/4, 1/8, 1/16, 1/32 - Modulation : Code Rate QPSK : 1/2, 2/3, 3/4, 5/6, 7/8 16-QAM : 1/2, 2/3, 3/4, 5/6, 7/8 64-QAM : 1/2, 2/3, 3/4, 5/6, 7/8 <p>► DVB-T2</p> <ul style="list-style-type: none"> - Guard Interval(Bitrate_Mbit/s) 1/4, 1/8, 1/16, 1/32, 1/128, 19/128, 19/256, - Modulation : Code Rate QPSK : 1/2, 2/5, 2/3, 3/4, 5/6 16-QAM : 1/2, 2/5, 2/3, 3/4, 5/6 64-QAM : 1/2, 2/5, 2/3, 3/4, 5/6 256-QAM : 1/2, 2/5, 2/3, 3/4, 5/6 <p>► DVB-C</p> <ul style="list-style-type: none"> - Symbolrate : 4.0Msymbols/s to 7.2Msymbols/s - Modulation : 16QAM, 64-QAM, 128-QAM and 256-QAM <p>► DVB-S</p> <ul style="list-style-type: none"> - Symbolrate DVB-S2 (8PSK/ QPSK) : 2 ~ 45 Msymbol/s DVB-S (QPSK) : 2 ~ 45 Msymbol/s - viterbi DVB-S mode : 1/2, 2/3, 3/4, 5/6, 7/8 DVB-S2 mode : 1/2, 2/3, 3/4, 3/5, 4/5, 5/6, 8/9, 9/10
4	Scart Gender Jack(1EA)	PAL, SECAM	Scart Jack is Full scart and support MNT/DTV-OUT, DTV Recording(not support DTV Auto AV)
5	Video Input RCA(2EA)	PAL, SECAM, NTSC	4System : PAL, SECAM, NTSC, PAL60 Rear 1EA, AV gender jack 1EA
6	Head phone out	Antenna, AV1, AV2, AV3, Component, RGB, HDMI1, HDMI2, HDMI3, HDMI4, USB	
7	Component Input(1EA)	Y/Cb/Cr, Y/Pb/Pr	Component Gender 1EA
8	RGB Input	RGB-PC	Analog(D-SUB 15PIN)
9	HDMI Input (4EA)	HDMI1-DTV/DVI HDMI2-DTV HDMI3-DTV HDMI4-DTV	PC(HDMI version 1.3) Support HDCP
10	Audio Input (4EA)	RGB/DVI Audio, Component, AV1, 2	L/R Input
11	SDPIF out (1EA)	SPDIF out	
12	USB (2EA)	EMF, DivX HD, For SVC(download)	JPEG, MP3, DivX HD

5. Component Video Input (Y, C_B/P_B, C_R/P_R)

No.	Specification				Remark
	Resolution	H-freq(kHz)	V-freq(Hz)		
1.	720x480	15.73	60.00	SDTV,DVD 480i	
2.	720x480	15.63	59.94	SDTV,DVD 480i	
3.	720x480	31.47	59.94	480p	
4.	720x480	31.50	60.00	480p	
5.	720x576	15.625	50.00	SDTV,DVD 625 Line	
6.	720x576	31.25	50.00	SDTV 576p	
7.	1280x720	45.00	50.00	HDTV 720p	
8.	1280x720	44.96	59.94	HDTV 720p	
9.	1280x720	45.00	60.00	HDTV 720p	
10.	1920x1080	31.25	50.00	HDTV 1080i	
11.	1920x1080	33.75	60.00	HDTV 1080i	
12.	1920x1080	33.72	59.94	HDTV 1080i	
13.	1920x1080	56.250	50	HDTV 1080p	
14.	1920x1080	67.5	60	HDTV 1080p	

6. RGB (PC)

No.	Specification				Proposed	Remarks
	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel Clock(MHz)		
1.	720*400	31.468	70.08	28.321		For only DOS mode
2.	640*480	31.469	59.94	25.17	VESA	Input 848*480 60 Hz, 852*480 60 Hz -> 640*480 60 Hz Display
3.	800*600	37.879	60.31	40.00	VESA	
4.	1024*768	48.363	60.00	65.00	VESA(XGA)	
5.	1360*768	47.72	59.8	84.75	WXGA	
6.	1920*1080	66.587	59.93	138.625	WUXGA	FHD model

7. HDMI Input

(1) DTV Mode

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	Remark
1.	720*480	31.469/31.5	59.94/60	27.00/27.03	SDTV 480P	
2.	720*576	31.25	50	54	SDTV 576P	
3.	1280*720	37.500	50	74.25	HDTV 720P	
4.	1280*720	44.96/45	59.94 /60	74.17/74.25	HDTV 720P	
5.	1920*1080	33.72/33.75	59.94 /60	74.17/74.25	HDTV 1080I	
6.	1920*1080	28.125	50.00	74.25	HDTV 1080I	
7.	1920*1080	26.97/27	23.97/24	74.17/74.25	HDTV 1080P	
8.	1920*1080	33.716/33.75	29.976 /30.00	74.25	HDTV 1080P	
9.	1920*1080	56.250	50	148.5	HDTV 1080P	
10.	1920*1080	67.43/67.5	59.94 /60	148.35/148.50	HDTV 1080P	

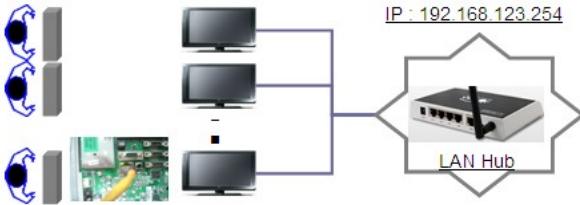
(2) PC Mode

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	Remark
1.	720*400	31.468	70.08	28.321		HDCP
2.	640*480	31.469	59.94	25.17	VESA	HDCP
3.	800*600	37.879	60.31	40.00	VESA	HDCP
4.	1024*768	48.363	60.00	65.00	VESA(XGA)	HDCP
5.	1360*768	47.72	59.8	84.75	WXGA	HDCP
6.	1280*1024	63.595	60.0	108.875	SXGA	HDCP/FHD model

3.3. LAN Inspection

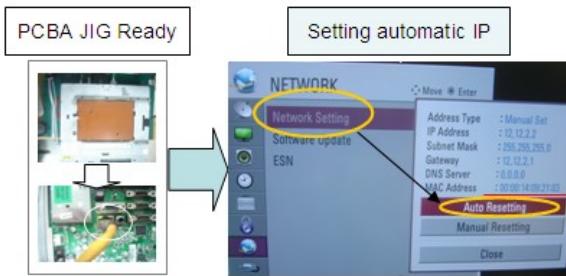
(1) Equipment & Condition

- Each other connection to LAN Port of IP Hub and Jig



(2) LAN inspection solution

- LAN Port connection with PCB
- Network setting at MENU Mode of TV
- setting automatic IP
- Setting state confirmation
-> If automatic setting is finished, you confirm IP and MAC Address.



3.4. Widevine Key Inspection

Widevine key Inspection

- Confirm key input Data at the "IN START" MENU Mode.



3.5. LAN PORT INSPECTION(PING TEST)

Connect SET -> LAN port == PC -> LAN Port



(1) Equipment setting

- 1) Play the LAN Port Test PROGRAM.
- 2) Input IP set up for an inspection to Test Program.
*IP Number : 12.12.2.2

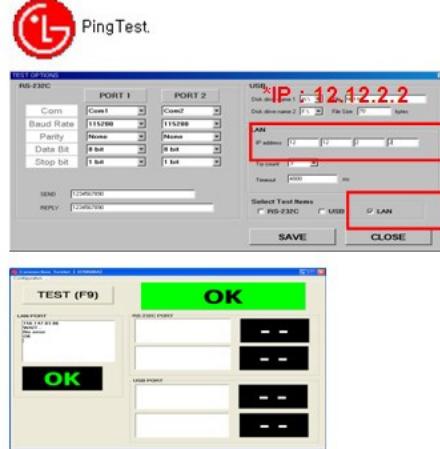
(2) LAN PORT inspection (PING TEST)

- 1) Play the LAN Port Test Program.
- 2) Connect each other LAN Port Jack.
- 3) Play Test (F9) button and confirm OK Message.
- 4) Remove LAN cable.

3.6. Model name & Serial number Download

(1) Model name & Serial number D/L

- Press "Power on" key of service remote control.
(Baud rate : 115200 bps)
- Connect RS232 Signal Cable to RS-232 Jack.
- Write Serial number by use RS-232.
- Must check the serial number at Instart menu.



(2) Method & notice

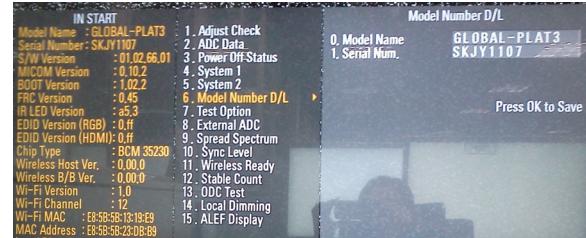
- Serial number D/L is using of scan equipment.
- Setting of scan equipment operated by Manufacturing Technology Group.
- Serial number D/L must be conformed when it is produced in production line, because serial number D/L is mandatory by D-book 4.0.

* Manual Download (Model Name and Serial Number)

If the TV set is downloaded by OTA or service man, sometimes model name or serial number is initialized.(Not always)

There is impossible to download by bar code scan, so It need Manual download.

- Press the 'instart' key of ADJ remote control.
- Go to the menu '5.Model Number D/L' like below photo.
- Input the Factory model name(ex 42LW950-ZA) or Serial number like photo.



- Check the model name Instart menu. -> Factory name displayed. (ex 42LW750S-ZA)

- Check the Diagnostics. (DTV country only) -> Buyer model displayed. (ex 42LW750S-ZA)

3.7. CI+ Key checking method

Check whether the key was downloaded or not at 'In Start' menu. (Refer to below).



=> Check the Download to CI+ key value in LGset.

3.7.1. Check the method of CI+ Key value

- (1) Check the method on Instart menu.
- (2) Check the method of RS232C Command.

1) Into the main assembly mode (RS232 : aa 00 00)

CMD 1	CMD 2	Data 0	
A	A	0	0

2) Check the key download for transmitted command.
(RS232 : ci 00 10)

CMD 1	CMD 2	Data 0	
C	I	1	0

3) Result value

- Normally status for download : OKx
- Abnormally status for download : NGx

3.7.2. Check the method of CI+ Key value (RS232)

1) Into the main assembly mode (RS232 : aa 00 00)

CMD 1	CMD 2	Data 0	
A	A	0	0

2) Check the method of CI+ key by command (RS232 : ci 00 20)

CMD 1	CMD 2	Data 0	
C	I	2	0

3) Result value

i 01 OK 1d1852d21c1ed5dcx

→ CI+ key Value

3.8. WIFI MAC ADDRESS CHECK

(1) Using RS232

	H-freq(kHz)	V-freq.(Hz)
Transmission	[A][I][][Set ID][][20][Cr]	[O][K][X] or [NG]

(2) Check the menu on in-start



4. Manual Adjustment

4.1. ADC Adjustment

ADC adjustment is needed because of OTP(Auto ADC adjustment)

4.2. EDID(The Extended Display Identification Data)/DDC(Display Data Channel) download

(1) Overview

It is a VESA regulation. A PC or a MNT will display an optimal resolution through information sharing without any necessity of user input. It is a realization of "Plug and Play".

(2) Equipment

- Since embedded EDID data is used, EDID download JIG, HDMI cable and D-sub cable are not need.
- Adjust remote control

(3) Download method

- 1) Press ADJ key on the Adjustment remote control, then select "12.EDID D/L", By pressing Enter key, enter EDID D/L menu.
- 2) Select [Start] button by pressing Enter key, HDMI1/ HDMI2/ HDMI3/ HDMI4/ RGB are Writing and display OK or NG.

(4) EDID DATA

■ HDMI

0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00	00	FF	FF	FF	FF	FF	FF	00	1E	6D					
0x01		01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
0x02	0F	50	54	A1	08	00	71	40	81	C0	81	0	81	80	95
0x03	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58
0x04	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B
0x05	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00
0x06	3F	1F	52	10	00	0A	20	20	20	20	20	20			
0x07													01	1	
0x00	02	03	37	F1	4E	10	1F	84	13	05	14	03	02	12	20
0x01	22	15	01	26	15	07	50	09	57	07					
0x02															
0x03					E3	05	03	01	01	1D	80	18	71	1C	16
0x04	2C	25	00	A0	5A	00	00	00	9E	01	1D	00	80	51	D0
0x05	20	6E	88	55	00	A0	5A	00	00	00	1A	02	3A	80	18
0x06	38	2D	40	58	2C	45	00	A0	5A	00	00	00	1E	00	00
0x07	00	00	00	00	00	00	00	00	00	00	00	00	00	00	2

■ RGB

0x00	0	FF	FF	FF	FF	FF	FF	0	1E	6D					
0x01		01	03	68	10	09	78	0A	EE	91	A3	54	4C	99	26
0x02	0F	50	54	A1	08	00	71	40	81	C0	81	0	81	80	95
0x03	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58
0x04	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B
0x05	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00
0x06	3E	1E	53	10	00	0A	20	20	20	20	20	20			
0x07													0	3	

■ Reference

- HDMI1 ~ HDMI4 / RGB
- In the data of EDID, bellows may be different by S/W or Input mode.

Product ID

Model Name	HEX	EDID Table	DDC Function
ALL	0001	0100	Analog
	0001	0100	Digital

Serial No. : Controlled on product line

Month, Year: Controlled on production line:

ex) Monthly : '01' -> '01'

Year : '2010' -> '14'

Model Name(Hex): LGTV

MODEL	MODEL NAME(HEX)
all	00 00 00 FC 00 4C 47 20 54 56 0A 20 20 20 20 20 20 20

Checksum: Changeable by total EDID data.

INPUT	1	2	3
HDMI1	7F	CB	X
HDMI2	7F	BB	X
HDMI3	7F	AB	X
HDMI4	7F	9B	X
RGB	X	X	98

Vendor Specific(HDMI)

INPUT	MODEL NAME(HEX)
HDMI1	78 03 0C 00 10 00 B8 2D 20 C0 0E 01 40 0A 3C 08 10 18 10 98 10 58 10 38 10
HDMI2	78 03 0C 00 20 00 B8 2D 20 C0 0E 01 40 0A 3C 08 10 18 10 98 10 58 10 38 10
HDMI3	78 03 0C 00 30 00 B8 2D 20 C0 0E 01 40 0A 3C 08 10 18 10 98 10 58 10 38 10
HDMI4	78 03 0C 00 40 00 B8 2D 20 C0 0E 01 40 0A 3C 08 10 18 10 98 10 58 10 38 10
HDMI5	78 03 0C 00 50 00 B8 2D 20 C0 0E 01 40 0A 3C 08 10 18 10 98 10 58 10 38 10

4.3. White Balance Adjustment

4.3.1 Overview

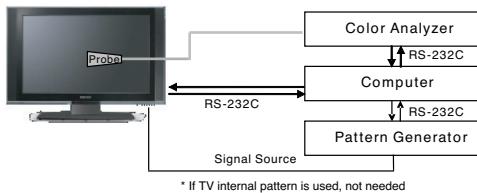
- (1) W/B adj. Objective & How-it-works
- (2) Objective: To reduce each Panel's W/B deviation
- (3) How-it-works : When R/G/B gain in the OSD is at 192, it means the panel is at its Full Dynamic Range. In order to prevent saturation of Full Dynamic range and data, one of R/G/B is fixed at 192, and the other two is lowered to find the desired value.
- (4) Adj. condition : normal temperature
 - 1) Surrounding Temperature : $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$
 - 2) Warm-up time: About 5 Min
 - 3) Surrounding Humidity : 20 % ~ 80 %

4.3.2 Equipment

- 1) Color Analyzer: CA-210 (LED Module : CH 14)
- 2) Adj. Computer(During auto adj., RS-232C protocol is needed)
- 3) Adjust Remote control
- 4) Video Signal Generator MSPG-925F 720p/216-Gray (Model:204, Pattern:80IRE)
-> Only when internal pattern is not available

- Color Analyzer Matrix should be calibrated using CS-1000

4.3.3. Equipment connection MAP



4.3.4. Adj. Command (Protocol)

<Command Format>

START [6E] A [50] A LEN A [03] A CMD A [00] A VAL A [CS] A STOP

- LEN: Number of Data Byte to be sent

- CMD: Command

- VAL: FOS Data value

- CS: Checksum of sent data

- A: Acknowledge

Ex) [Send: JA_00_DD] / [Ack: A_00_okDDX]

■ RS-232C Command used during auto-adj.

RS-232C COMMAND	Explanation
[CMD ID DATA]	
wb 00 00	Begin White Balance adj.
wb 00 10	Gain adj.(internal white pattern)
wb 00 1f	Gain adj. completed
wb 00 20	Offset adj.(internal white pattern)
wb 00 2f	Offset adj. completed
wb 00 ff	End White Balance adj.(Internal pattern disappears)

Ex) wb 00 00 -> Begin white balance auto-adj.

wb 00 10 -> Gain adj.

ja 00 ff -> Adj. data

jb 00 c0

...

...

wb 00 1f -> Gain adj. completed

*(wb 00 20(Start), wb 00 2f(completed)) -> Off-set adj.

wb 00 ff -> End white balance auto-adj.

■ Adj. Map

	ITEM	Command		Data Range(Hex.)		Default(Decimal)
		Cmd 1	Cmd 2	Min	Max	
Cool	R-Gain	j	g	00	C0	
	G-Gain	j	h	00	C0	
	B-Gain	j	i	00	C0	
	R-Cut					
	G-Cut					
	B-Cut					
Medium	R-Gain	j	a	00	C0	
	G-Gain	j	b	00	C0	
	B-Gain	j	c	00	C0	
	R-Cut					
	G-Cut					
	B-Cut					
Warm	R-Gain	j	d	00	C0	
	G-Gain	j	e	00	C0	
	B-Gain	j	f	00	C0	
	R-Cut					
	G-Cut					

4.3.5. Adjustment method

(1) Auto adjustment method

- 1) Set TV in adj. mode using POWER ON key.
- 2) Zero calibrate probe then place it on the center of the Display.
- 3) Connect Cable. (RS-232C)
- 4) Select mode in adj. Program and begin adjustment.
- 5) When adjustment is complete (OK Sign), check adj. status pre mode.(Warm, Medium, Cool)
- 6) Remove probe and RS-232C cable to complete adjustment.

■ W/B Adj. must begin as start command “wb 00 00”, and finish as end command “wb 00 ff”, and Adj. offset if need.

(2) Manual adjustment method

- 1) Set TV in Adjustment mode using POWER ON.
- 2) Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10 cm of the surface.
- 3) Press ADJ key -> EZ adjust using Adjustment remote control -> 7. White-Balance then press the cursor to the right(▶) key.
(When key(▶) is pressed 216 Gray internal pattern will be displayed.)
- 4) One of R Gain / G Gain / B Gain should be fixed at 192, and the rest will be lowered to meet the desired value.
- 5) Adj. is performed in COOL, MEDIUM, WARM 3 modes of color temperature.

■ If internal pattern is not available, use RF input. In EZ Adj. menu 7.White Balance, you can select one of 2 Test-pattern: ON, OFF. Default is inner(ON). By selecting OFF, you can adjust using RF signal in 216 Gray pattern.

■ Adj. condition and cautionary items

- 1) Lighting condition in surrounding area
Surrounding lighting should be lower 10 lux. Try to isolate adj. area into dark surrounding.
- 2) Probe location : Color Analyzer(CA-210) probe should be within 10 cm and perpendicular of the module surface (80° ~ 100°)
- 3) Aging time
 - After Aging Start, Keep the Power ON status during 5 Minutes.
 - In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

4.3.6. Reference(White Balance Adj. coordinate and temperature)

■ Luminance : 204 Gray

■ Standard color coordinate and temperature using CS-1000 (over 26 inch)

Mode	Color Coordination		Temp	ΔUV
	x	y		
COOL	0.269	0.273	13000 K	0.0000
MEDIUM	0.285	0.293	9300 K	0.0000
WARM	0.313	0.329	6500 K	0.0000

■ Standard color coordinate and temperature using CA-210 (CH 14)

Mode	Color Coordination		Temp	ΔUV
	x	y		
COOL	0.269 ± 0.002	0.273 ± 0.002	13000 K	0.0000
MEDIUM	0.285 ± 0.002	0.293 ± 0.002	9300 K	0.0000
WARM	0.313 ± 0.002	0.329 ± 0.002	6500 K	0.0000

4.3.7. ALELF & Edge LED White balance table

■ Edge LED module change color coordinate because of aging time.

■ Apply under the color coordinate table, for compensated aging time.

[ALELF]

GP3	Aging Time (Min.)	Cool		Medium		Warm	
		X	Y	X	Y	X	Y
		269	273	285	293	313	329
1	0-2	282	294	298	314	322	343
2	3-5	281	292	297	312	321	341
3	6-9	280	291	296	311	320	340
4	10-19	279	289	295	309	319	338
5	20-35	277	284	293	304	317	333
6	36-49	274	279	290	299	314	328
7	50-79	271	277	287	297	311	326
8	80-149	270	274	286	294	310	323
9	Over 150	269	273	285	293	309	322

4.4. Wireless function check

Step 1) Connect set and Dongle of Wireless to Cable of HDMI & TTA 20Pin

Step 2) At OSD of SET, check the message like Fig.3

Step 3) Detach Cable of Wireless Dongle



Connect



Fig.2
<Wireless Ready Set>

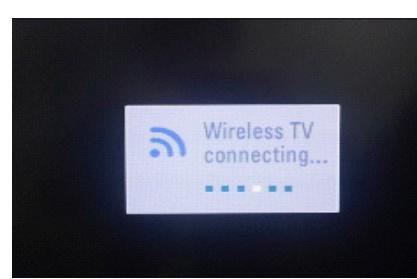


Fig.3
<Dongle Connection Display>

4.5. EYE-Q function check

- Step 1) Turn on TV.
- Step 2) Press EYE key of Adjustment remote control.
- Step 3) Cover the Eye Q II sensor on the front of the using your hand and wait for 6 seconds.
- Step 4) Confirm that R/G/B value is lower than 10 of the "Raw Data (Sensor data, Back light)". If after 6 seconds, R/G/B value is not lower than 10, replace Eye Q II sensor.
- Step 5) Remove your hand from the Eye Q II sensor and wait for 6 seconds.
- Step 6) Confirm that "ok" pop up. If change is not seen, replace Eye Q II sensor.



4.6. Local Dimming Function Check

- (1) Turn on TV.
- (2) At the Local Dimming mode, module Edge Backlight moving Top to Bottom Back light of IOP module moving.
- (3) Confirm the Local Dimming mode.
- (4) Press "exit" key

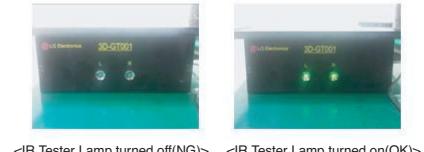
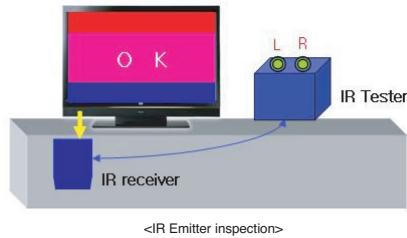


4.7. Magic Motion Remote control test

- Equipment : RF Remote control for test, IR-KEY-Code Remote control for test
- You must confirm the battery power of RF-Remote control before test.(recommend that change the battery per every lot)
- Sequence (test)
 - 1) if you select the 'start key(Mute)' on the controller, you can pairing with the TV SET.
 - 2) You can check the cursor on the TV Screen, when select the 'OK' key on the controller.
 - 3) You must remove the pairing with the TV Set by select 'Vol+(STOP)' key on the controller.

4.8. RF emitter inspection

- (1) Start 3D pattern inspection
- (2) If RF emitter signal is correctly received to RF receiver, the lamp of RF tester turn on.



4.9. Option selection per country

- (1) Overview
 - Option selection is only done for models in Non-EU.
 - Applied model: LD12D/N Chassis applied EU model.
- (2) Method
 - 1) Press ADJ key on the Adjustment remote control, then select Country Group Menu.
 - 2) Depending on destination, select Country Group Code 04 or Country Group EU then on the lower Country option, select US, CA, MX. Selection is done using +, - or ▶◀ KEY.

4.10. Tool Option selection

- Method : Press Adj. key on the Adjustment remote control, then select Tool option.

4.11. Ship-out mode check(In-stop)

After final inspection, press IN-STOP key of the Adjustment remote control and check that the unit goes to Stand-by mode.

5. GND and Internal Pressure check

5.1. Method

- 1) GND & Internal Pressure auto-check preparation
 - Check that Power Cord is fully inserted to the SET.
(If loose, re-insert)
- 2) Perform GND & Internal Pressure auto-check
 - Unit fully inserted Power cord, Antenna cable and A/V arrive to the auto-check process.
 - Connect D-terminal to AV JACK TESTER
 - Auto CONTROLLER(GWS103-4) ON
 - Perform GND TEST
 - If NG, Buzzer will sound to inform the operator.
 - If OK, changeover to I/P check automatically.
(Remove CORD, A/V form AV JACK BOX.)
 - Perform I/P test.
 - If NG, Buzzer will sound to inform the operator.
 - If OK, Good lamp will lit up and the stopper will allow the pallet to move on to next process.

5.2. Checkpoint

- TEST voltage
 - GND: 1.5 KV/min at 100 mA
 - SIGNAL: 3 KV/min at 100 mA
- TEST time: 1 second
- TEST POINT
 - GND TEST = POWER CORD GND & SIGNAL CABLE METAL GND
 - Internal Pressure TEST = POWER CORD GND & LIVE & NEUTRAL
- LEAKAGE CURRENT: At 0.5 mArms

6. Audio

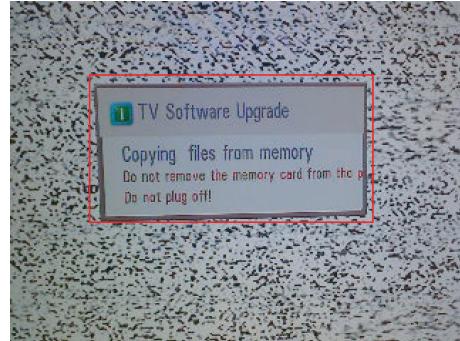
No.	Item	Min.	Typ.	Max.	Unit	
1.	Audio practical max Output, L/R (Distortion=10 % max Output)		10	12	W	EQ Off AVL Off Clear Voice Off
			8.9	9.8	Vrms	
2.	Speaker (8 Ω Impedance)		10	12	W	EQ On AVL On Clear Voice On

Measurement condition:

1. RF input: Mono, 1 KHz sine wave signal, 100 % Modulation
2. CVBS, Component: 1 KHz sine wave signal 0.4 Vrms
3. RGB PC: 1 KHz sine wave signal 0.7 Vrms

7. USB S/W download(option, service only)

- 1) Put the USB Stick to the USB socket.
- 2) Automatically detecting update file in USB Stick.
 - If your downloaded program version in USB Stick is Low, it didn't work. But your downloaded version is High, USB data is automatically detecting.
- 3) Show the message "Copying files from memory".



- 4) Updating is starting.



- 5) Updating Completed, The TV will restart automatically.

- 6) If your TV is turned on, check your updated version and Tool option. (explain the Tool option, next stage)
 - * If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. if all channel data is cleared, you didn't have a DTV/ATV test on production line.

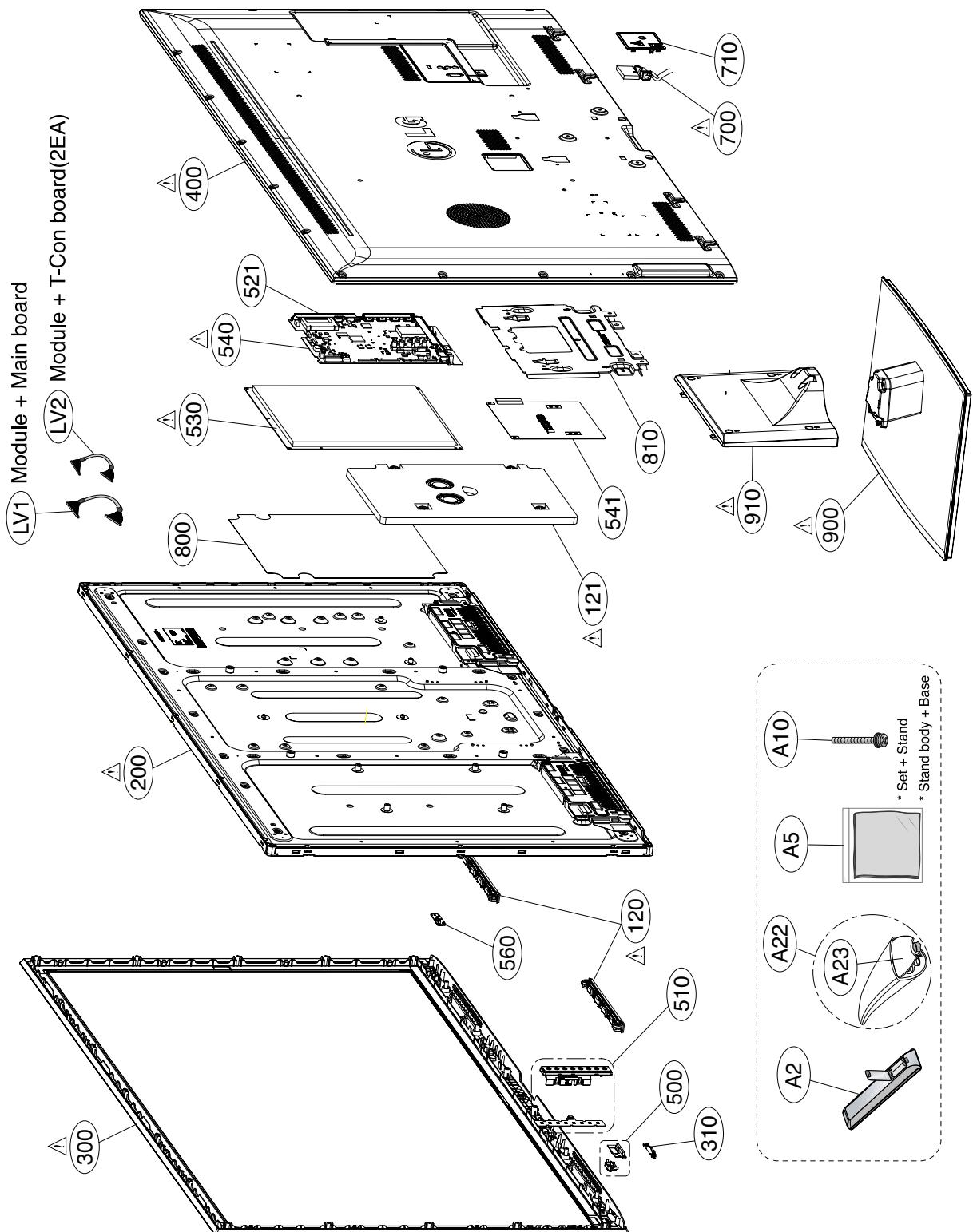
* After downloading, have to adjust TOOL OPTION again.

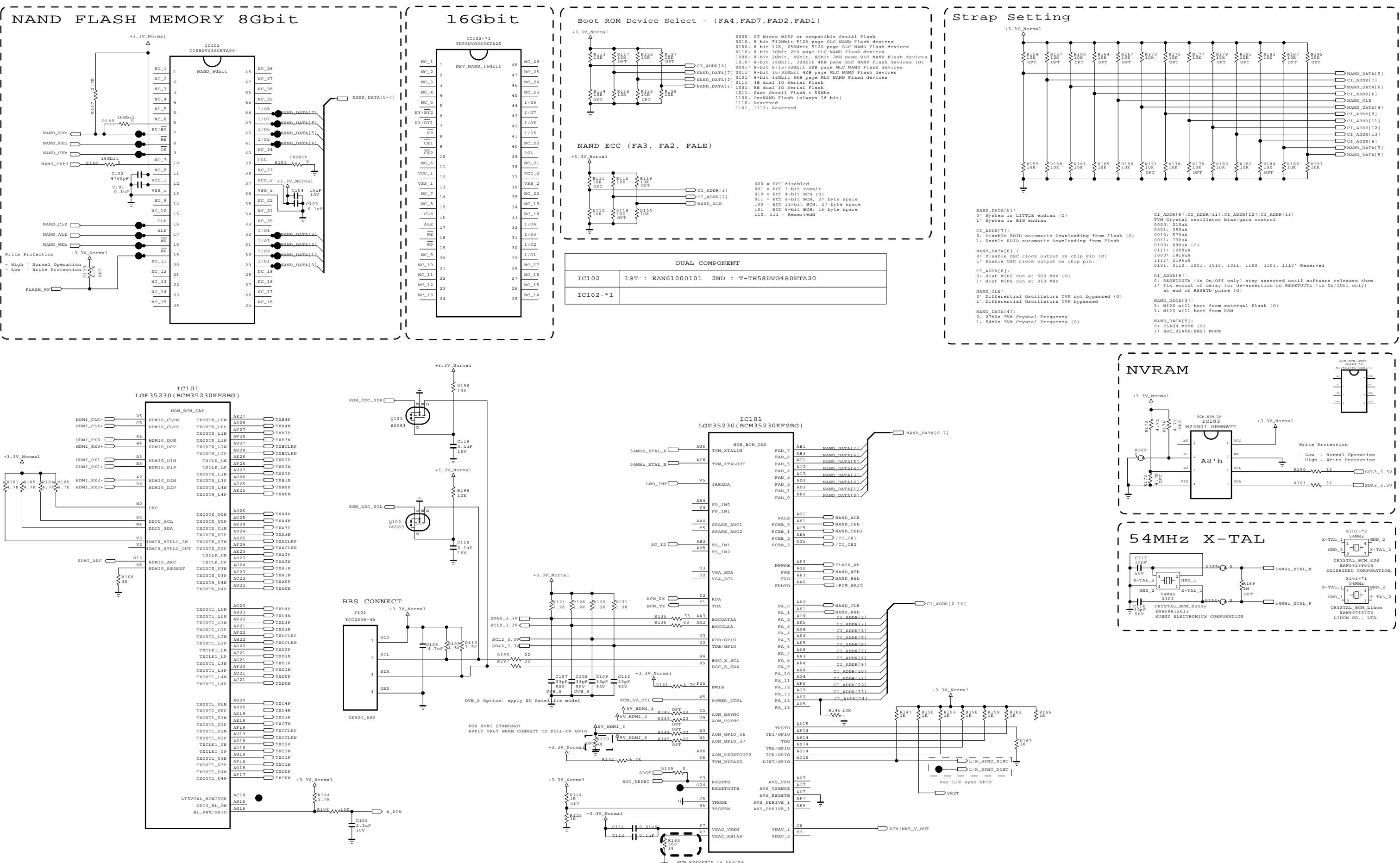
- 1) Push "IN-START" key in service remote control.
- 2) Select "Tool Option 1" and push "OK" key.
- 3) Punch in the number.(Each model has their number.)

EXPLODED VIEW

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by \triangle in the Schematic Diagram and EXPLODED VIEW.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent X-RADIATION, Shock, Fire, or other Hazards.
Do not modify the original design without permission of manufacturer.

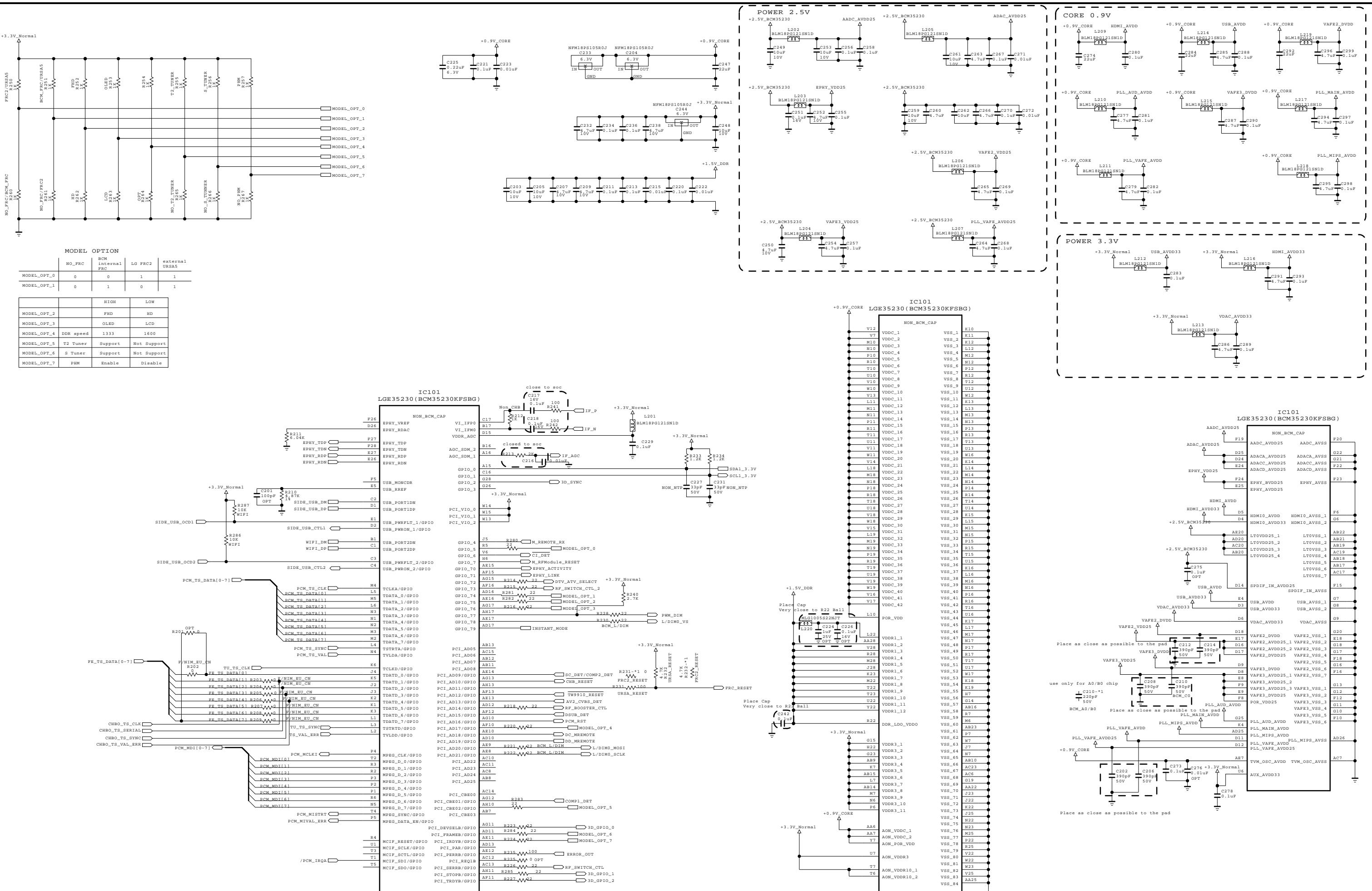




THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

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 LG ELECTRONICS

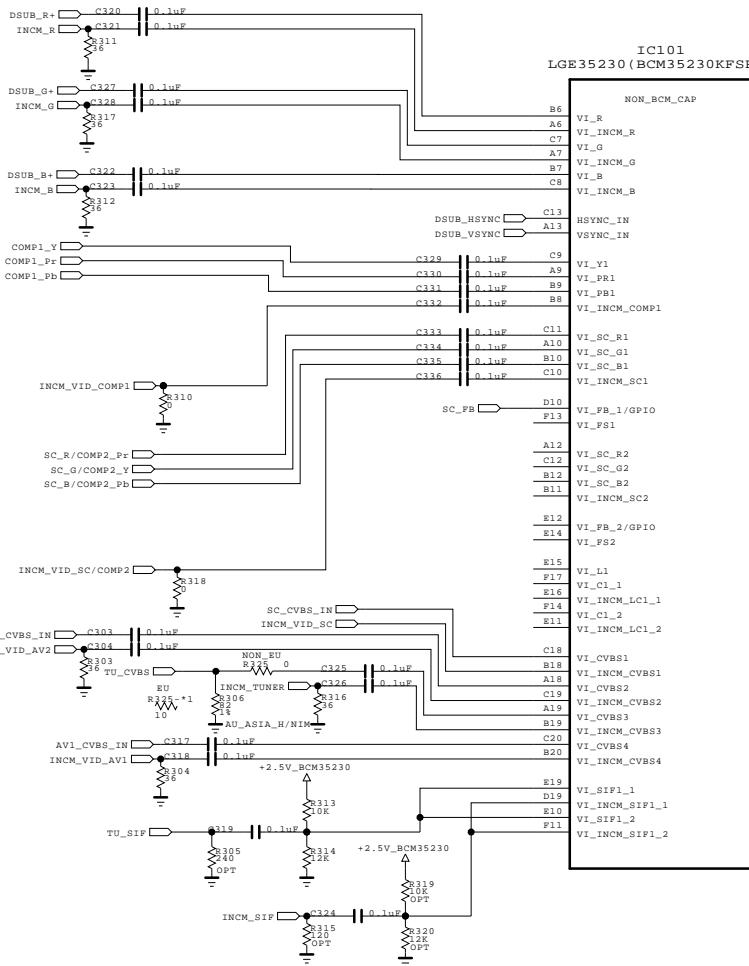


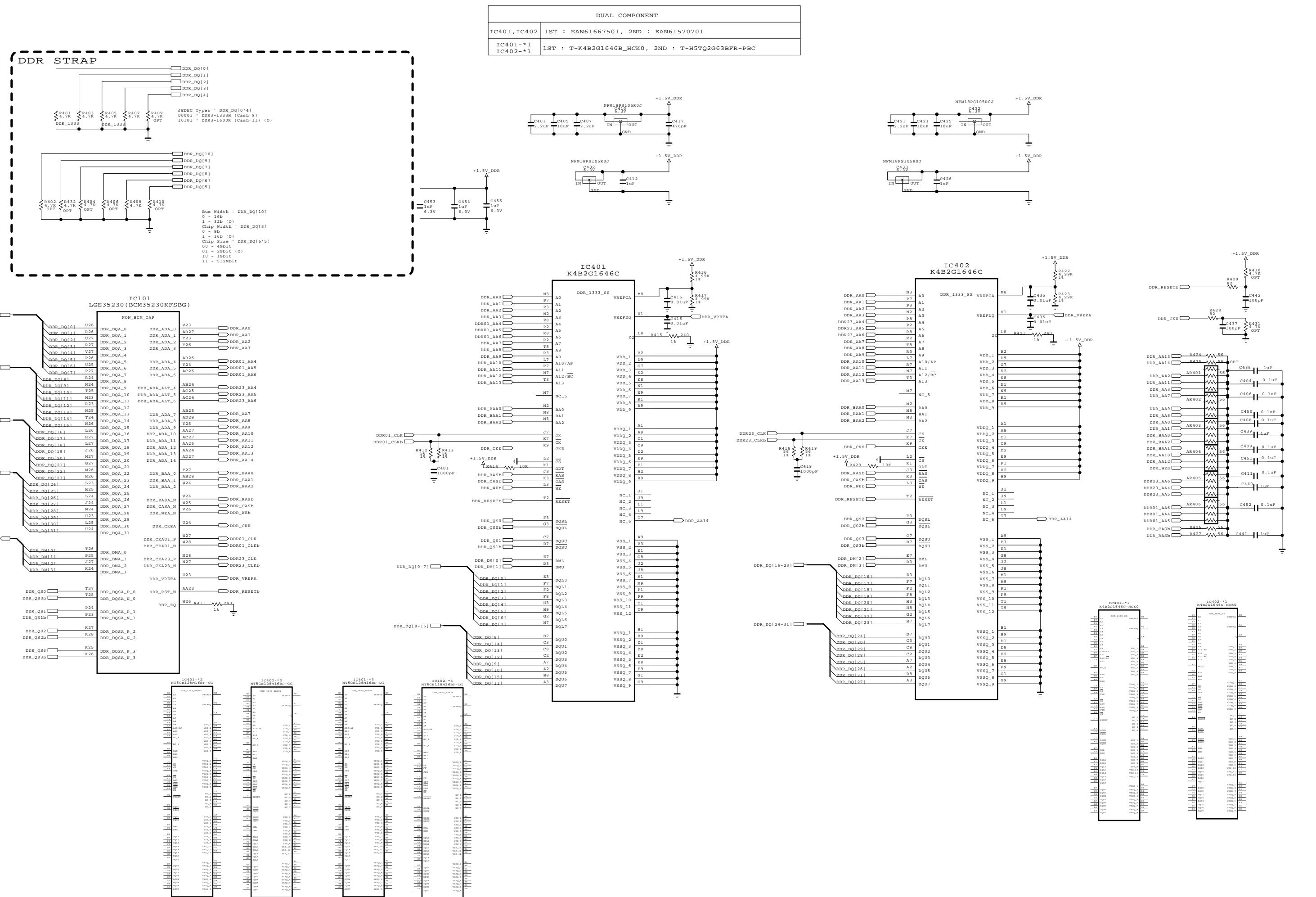
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MODEL	BCM35230	DATE	
BLOCK	MAIN POWER	SHEET	2 / 50



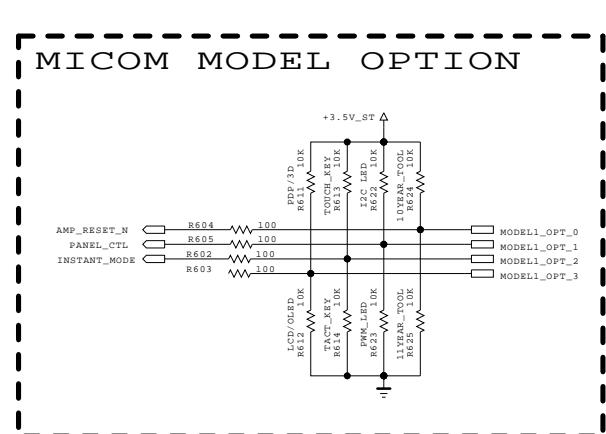
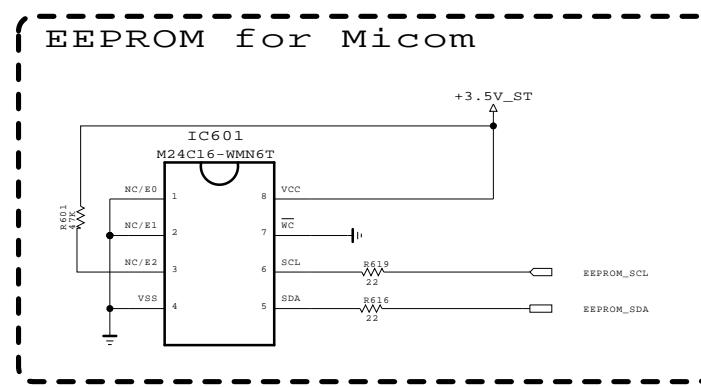
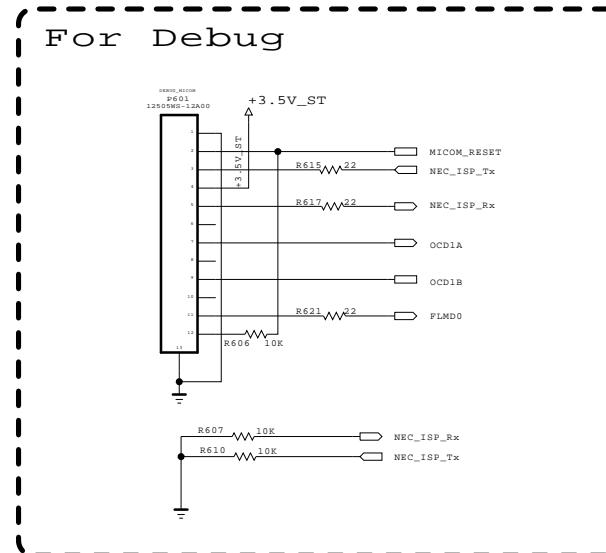


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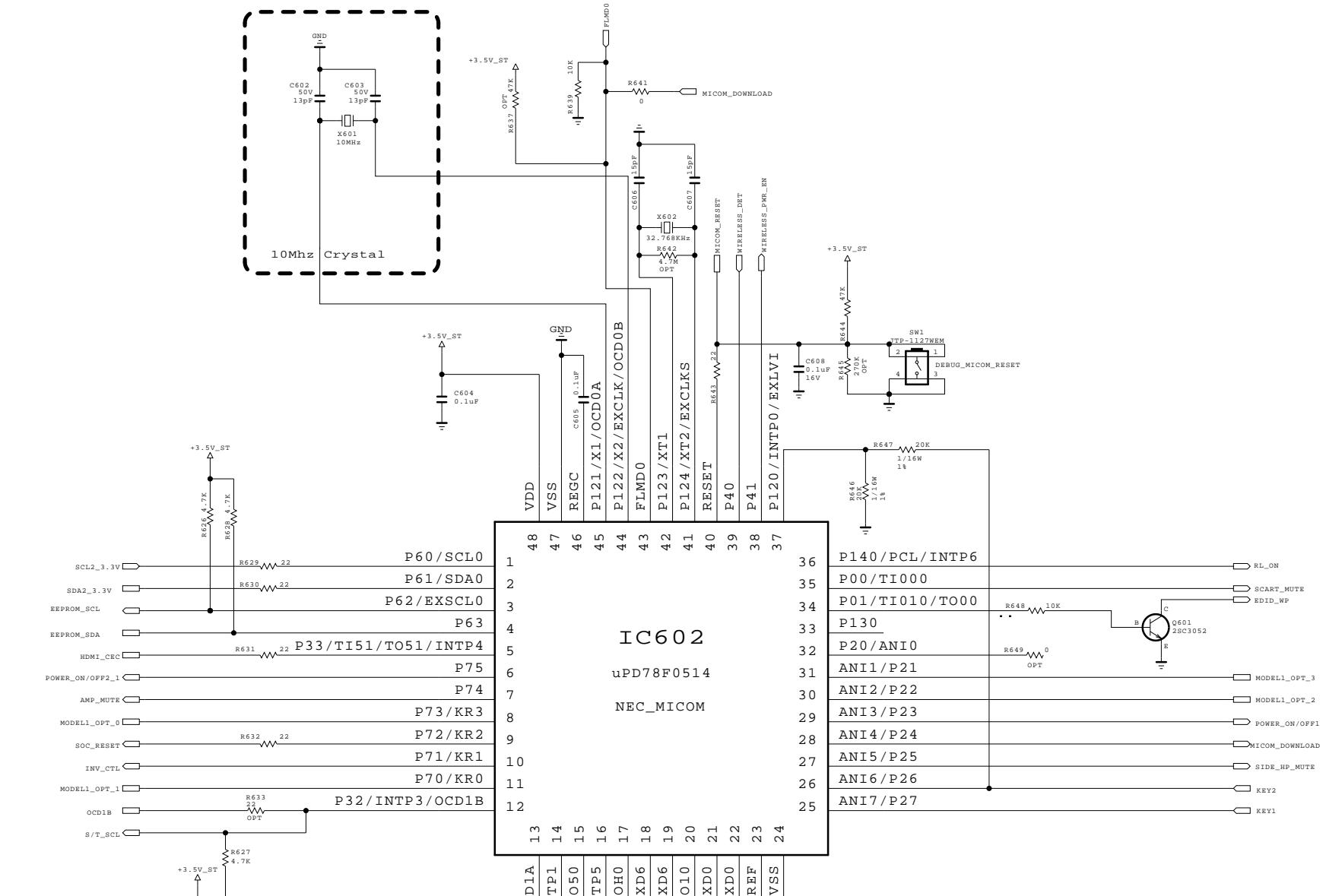
MODEL	BCM35230	DATE	
BLOCK	MAIN DDR	SHEET	4 / 50



MODEL OPTION			
PIN NAME	PIN NO.	HIGH	LOW
MODEL_OPT_0	8	10YEAR_TOOL (10 SENSOR)	11YEAR_TOOL (11 SENSOR)
MODEL_OPT_1	11	I2C_LED	PWM_LED
MODEL_OPT_2	30	TOUCH_KEY	TACT_KEY
MODEL_OPT_3	31	PDP/3D	LCD/OLED

MODEL_OPT_3	LCD	PDP	OLED	3D
	0	1	0	1
MODEL_OPT_1	LOW	LOW_SMALL	TBD	HIGH
	0	0	1	1

MODEL_OPT_2

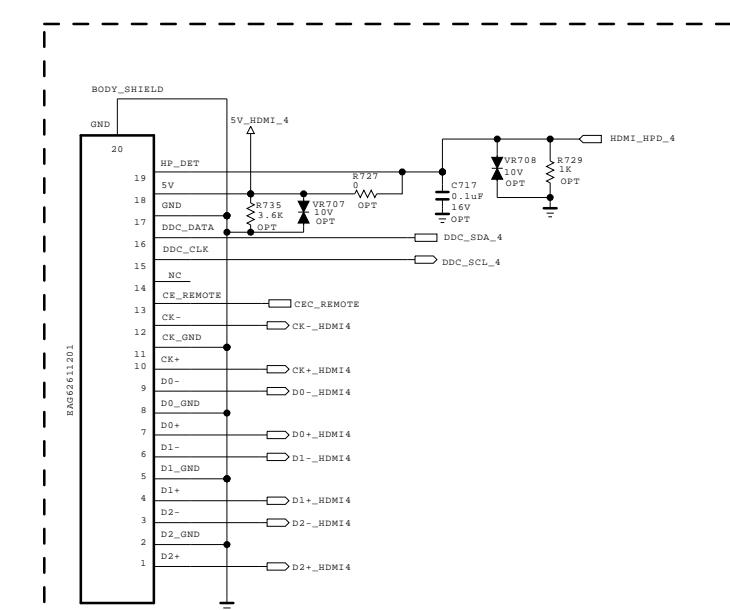
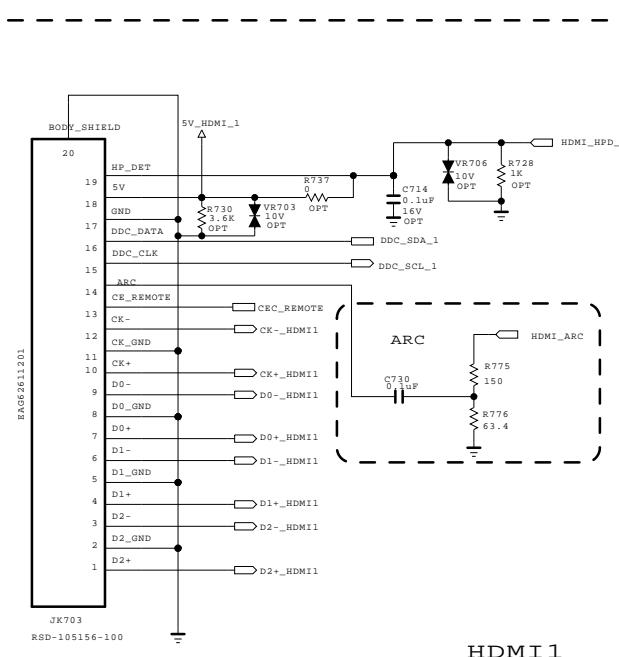


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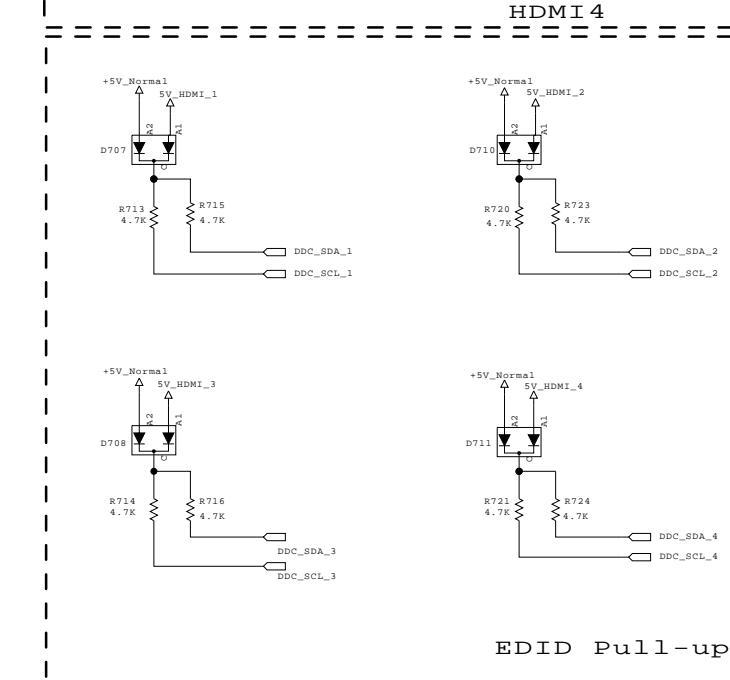
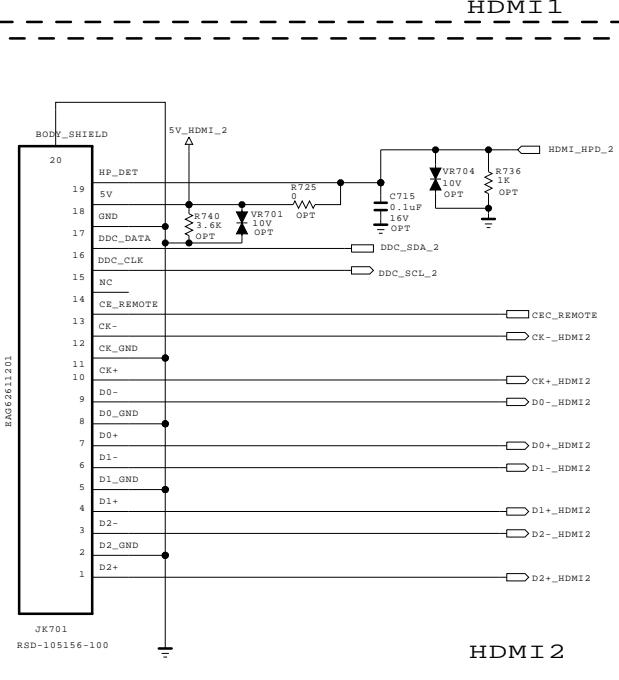
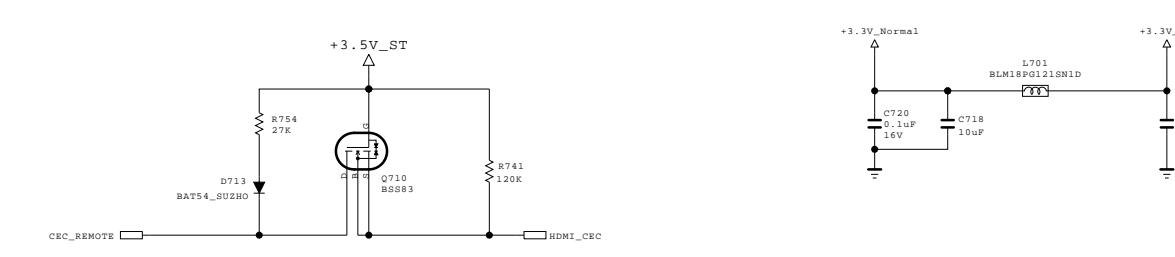
LG ELECTRONICS

MODEL BLOCK	BCM35230	DATE SHEET	
	MICOM		

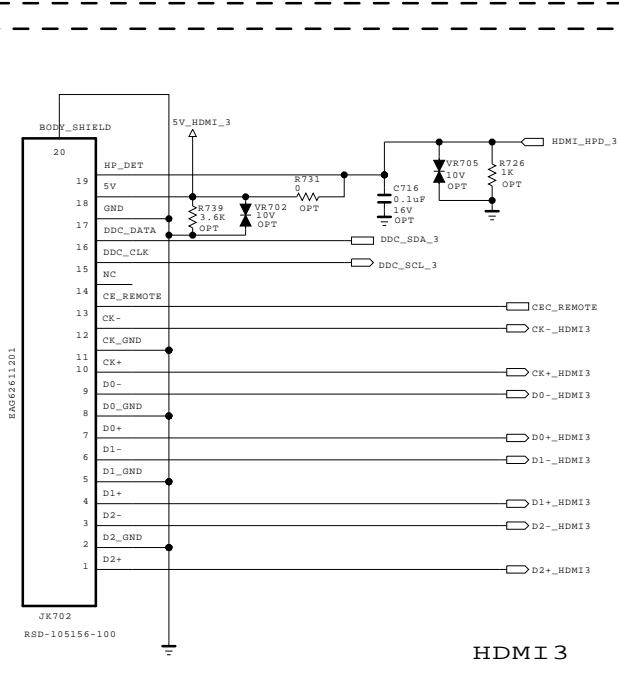


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D707, D708	1ST : ODD184009AA 2ND : ODSIH00028A
D710, D711	
D713	1ST : T-BAT54_SUZHO, 2ND : ODSO00138A

* HDMI CEC



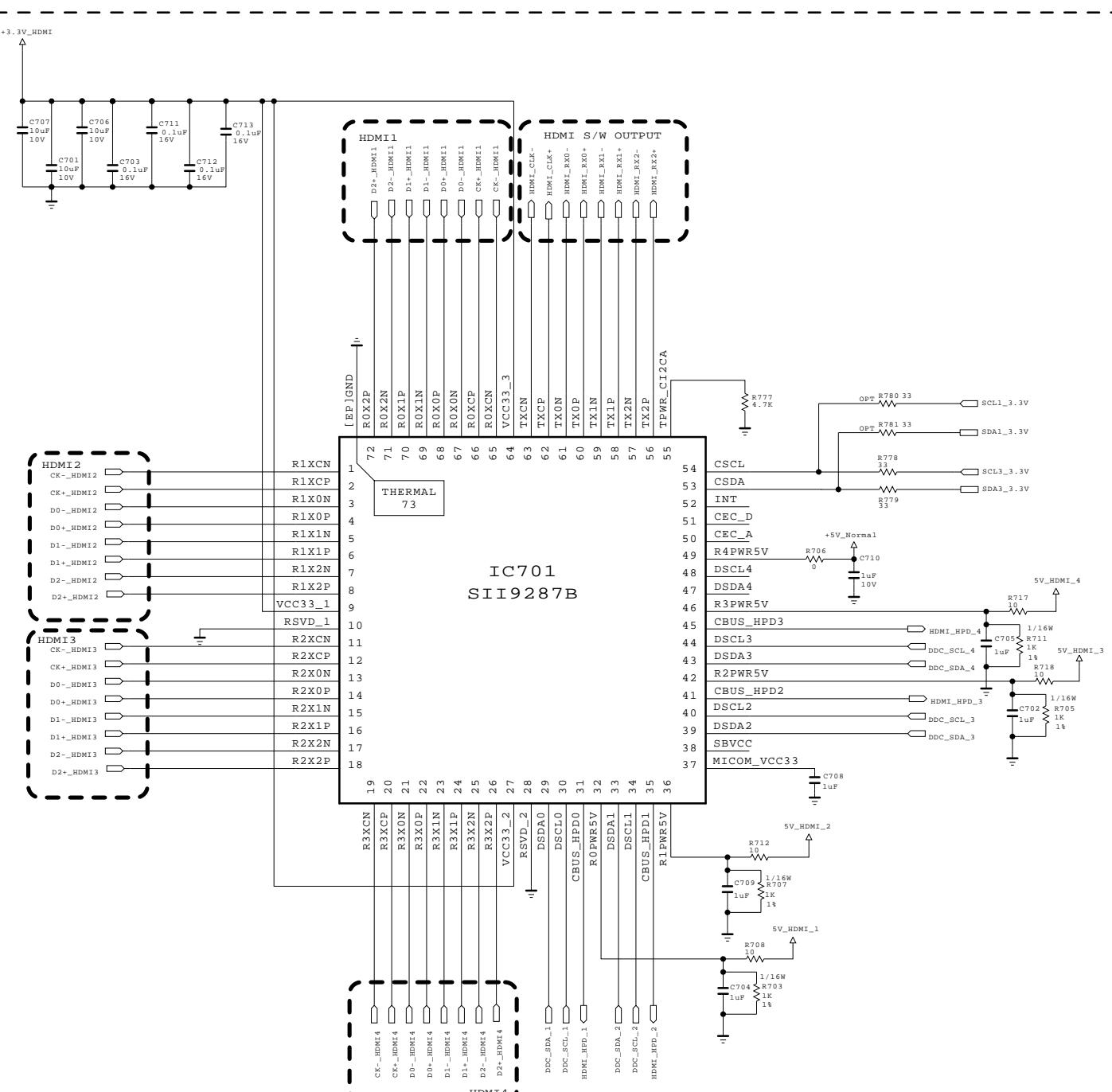
EDID Pull-up



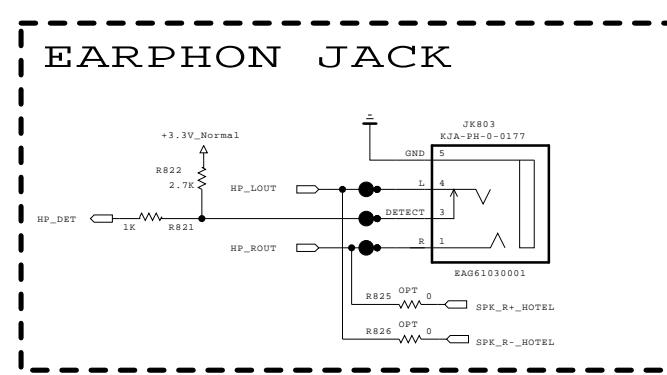
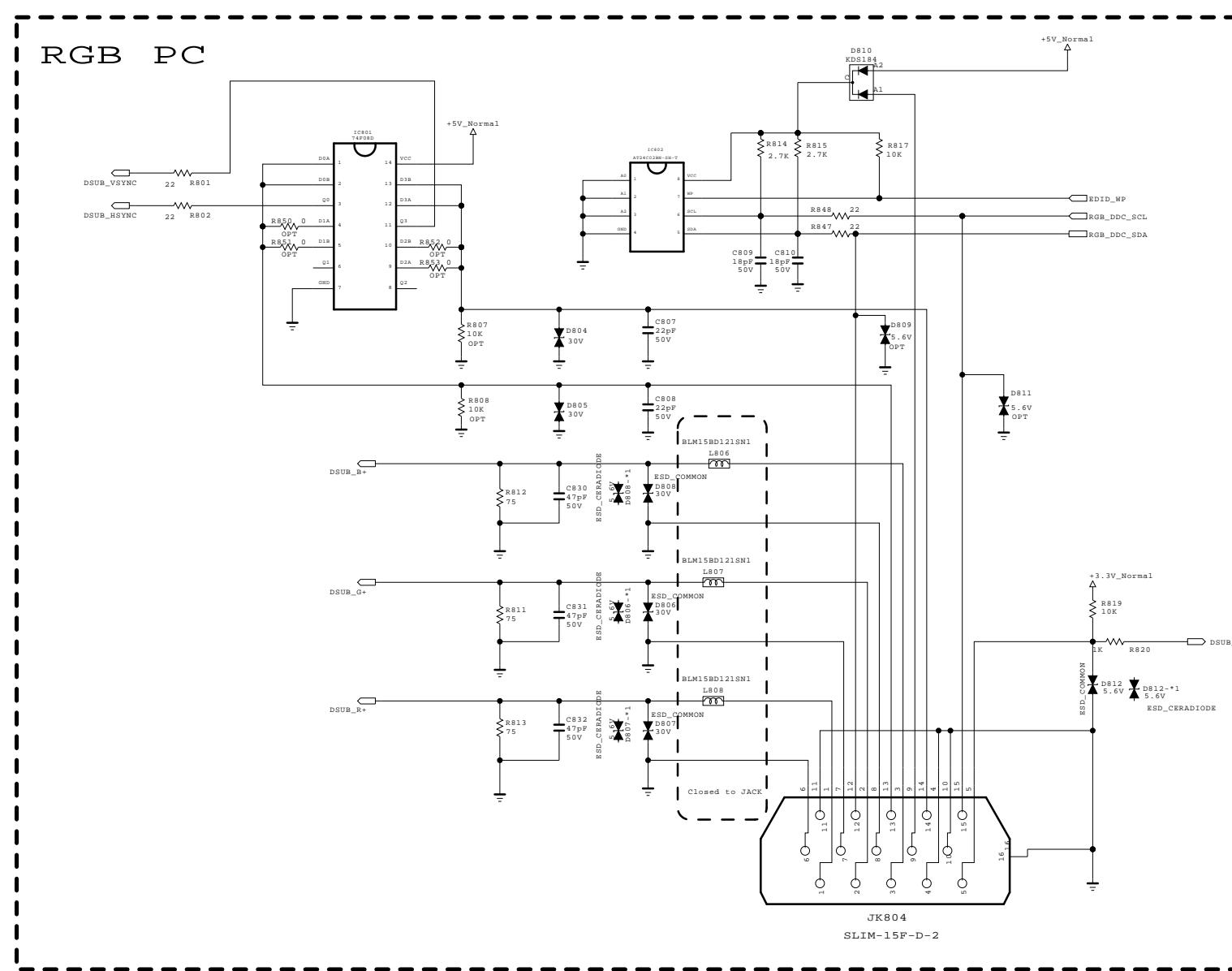
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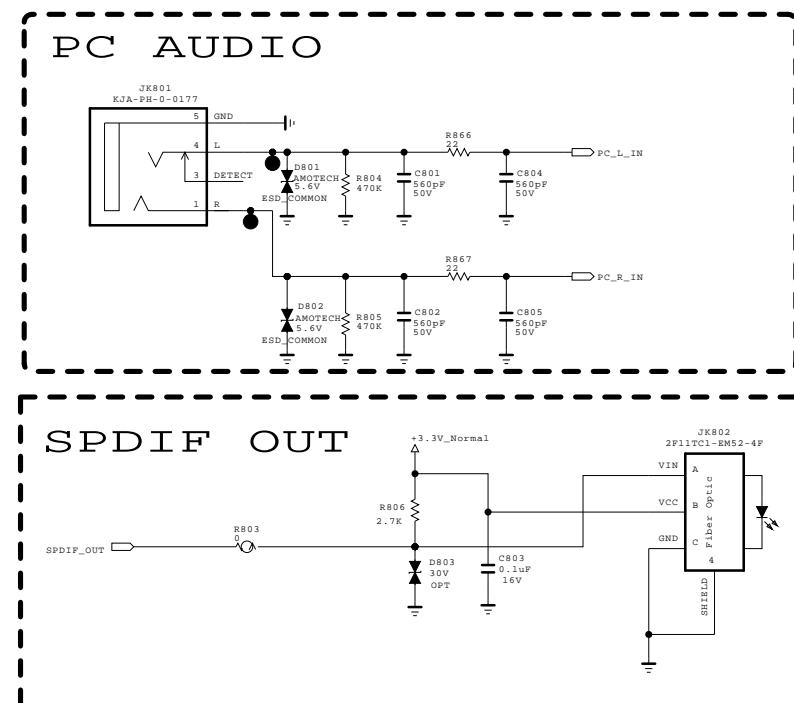
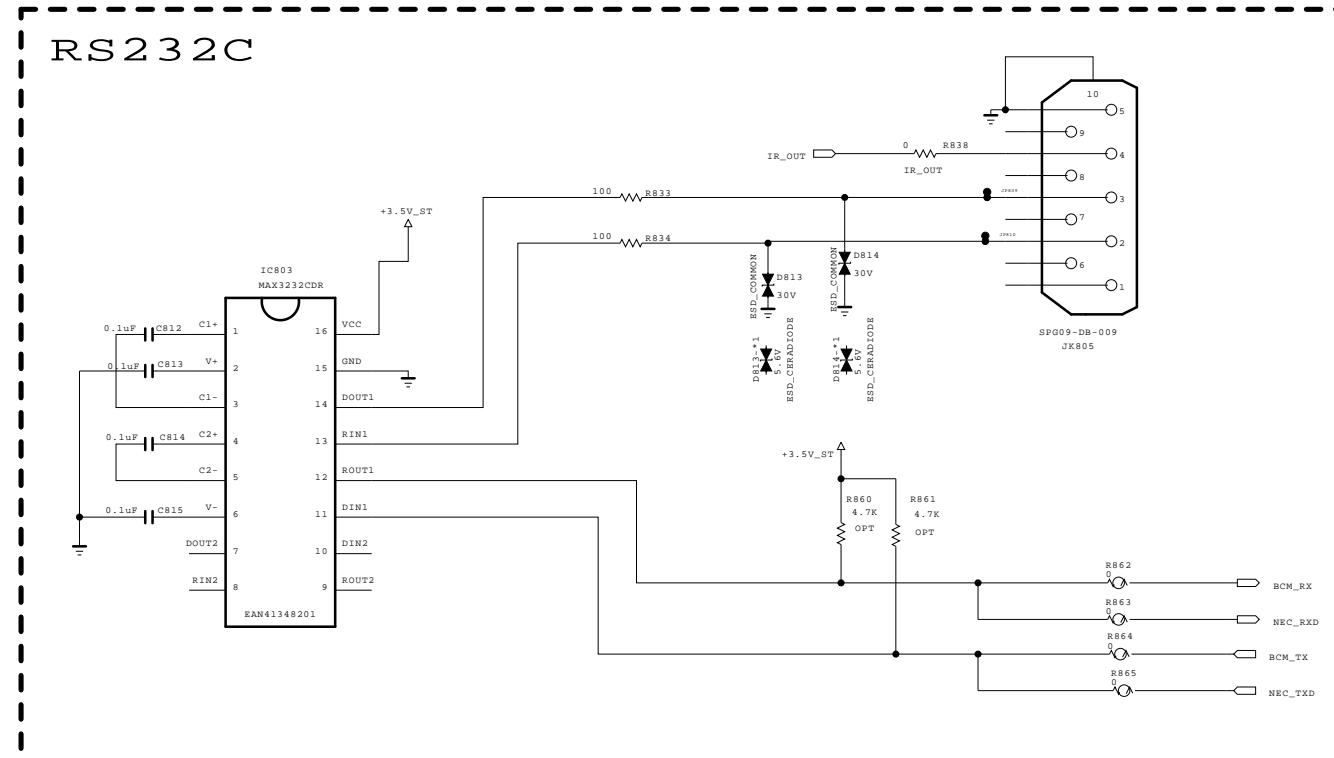
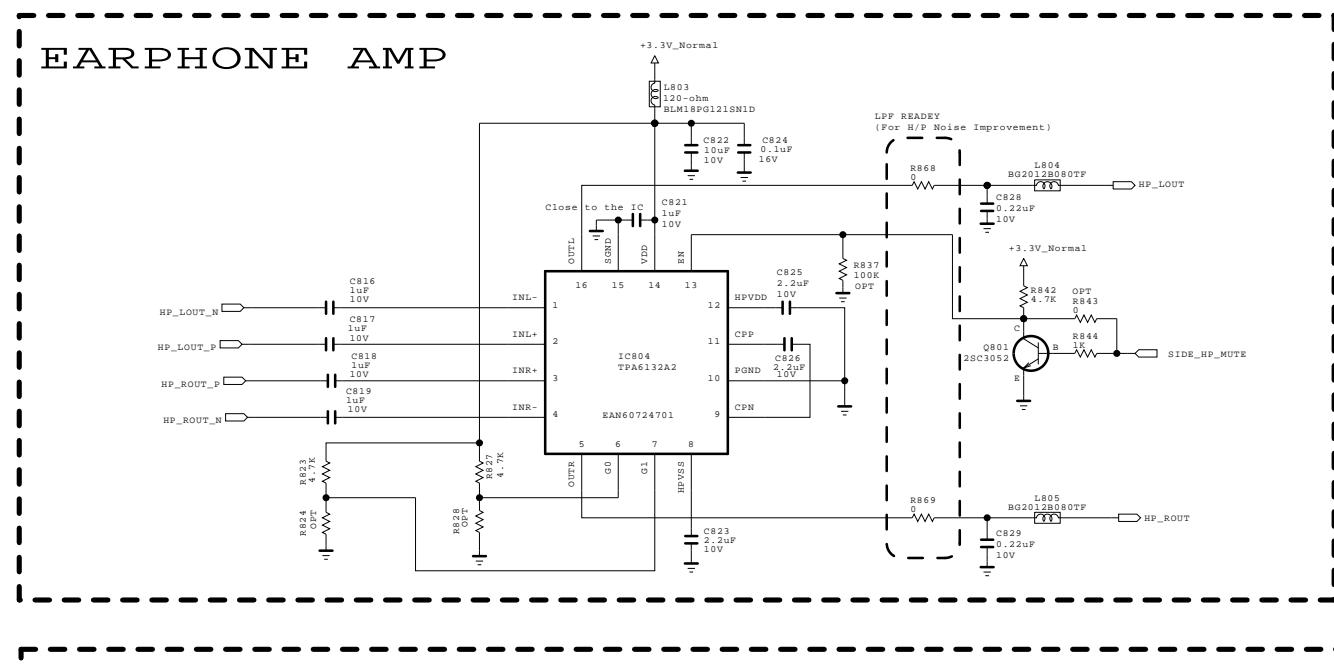
LG ELECTRONICS



MODEL	BCM35230	DATE	
BLOCK	HDMI	SHEET	7 / 31



DUAL COMPONENT	
D804, D805, D806	1ST : EAH3491601, 2ND : EAH33945901
D807, D808, D813	D810 1ST : ODD184009AA, 2ND : ODSI00028A
D814	Q801 1ST : OTR1Y80001A, 2ND : OTR387500AA
	IC805 1ST : EAN61151201, 2ND : EAN61130001



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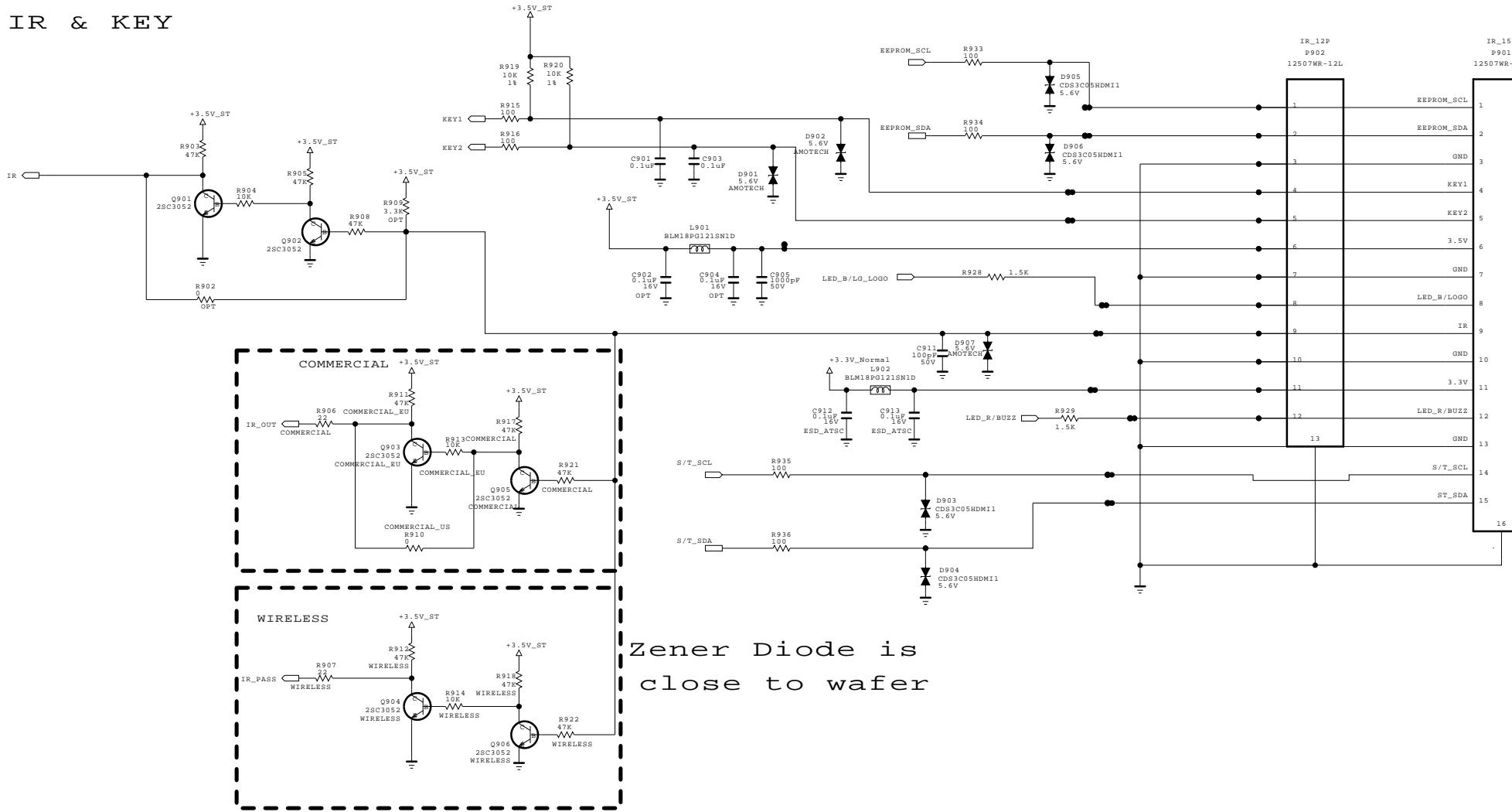
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MODEL	BCM35230	DATE	2010.10.21
BLOCK	COMMON JACK	SHEET	8 / 58

DUAL COMPONENT	
Q901, Q902, Q903 Q904, Q905, Q906	1ST : OTRIY80001A 2ND : OTR387500AA
D903, D904 D905, D906	1ST : EAH42720601, 2ND : EAH60994401

IR & KEY



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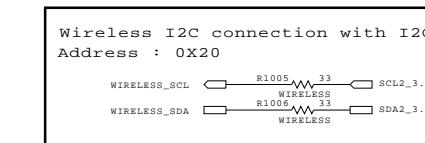
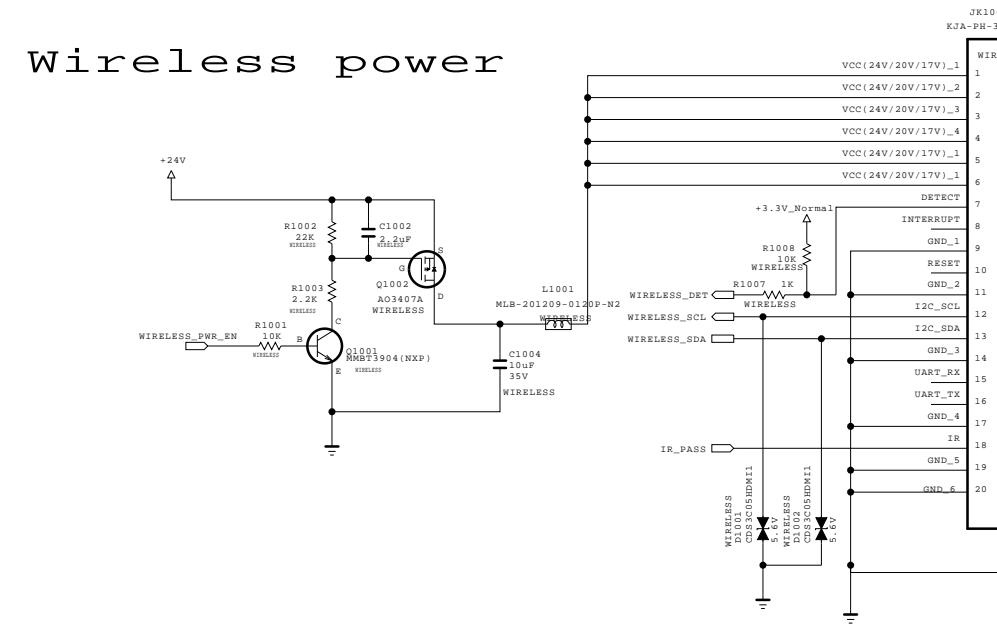
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MODEL	BCM35230	DATE	
BLOCK	IR/KEY	SHEET	9 / 50

WIRELESS READY MODEL

DUAL COMPONENT	
D1001,D1002	1ST : EAH42720601 2ND : EAH60994401
Q1001	1ST : EBK61012601, 2ND : OTRDI80002A
Q1002	1ST : EBK60752501, 2ND : EBK61011501

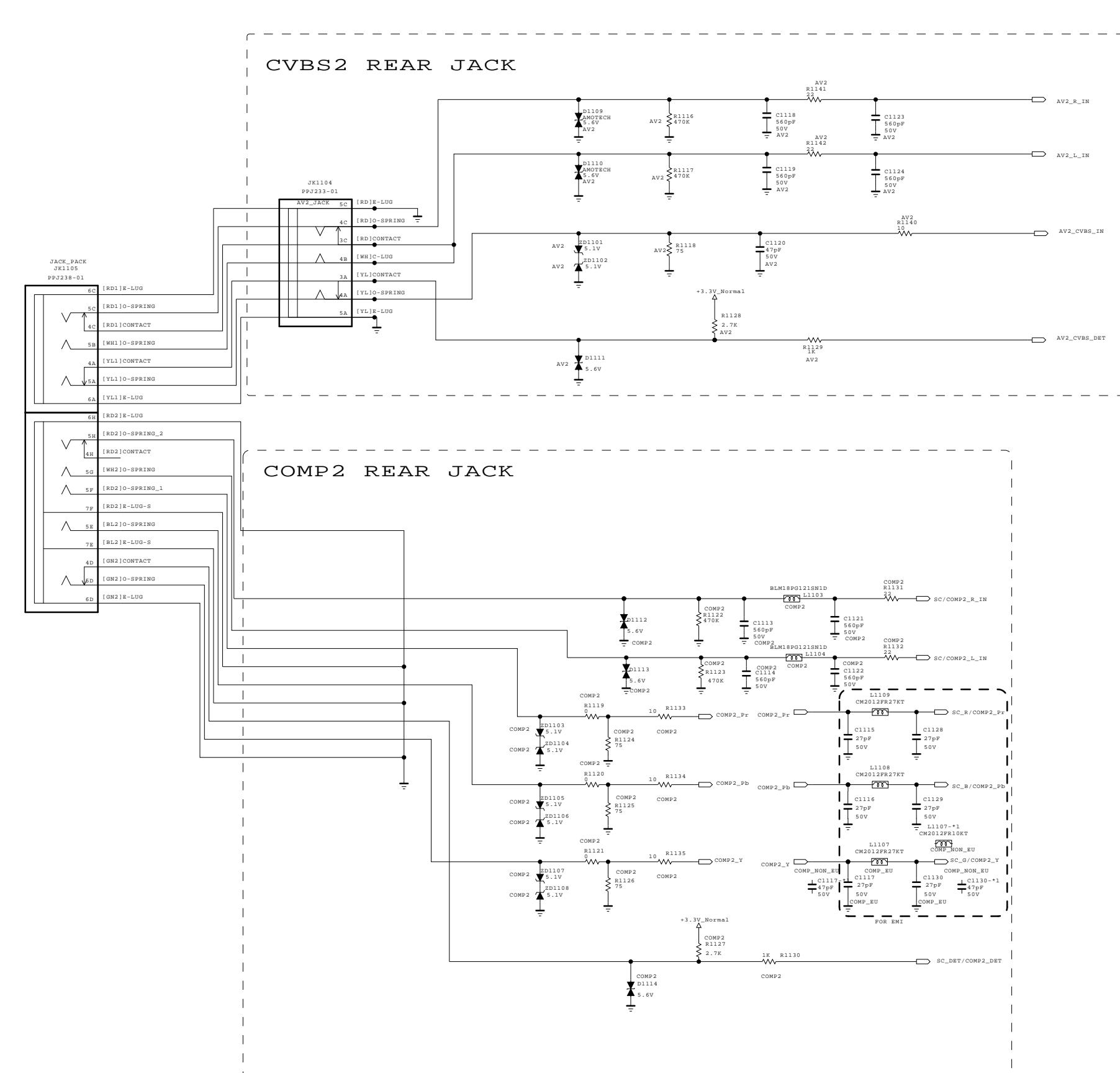
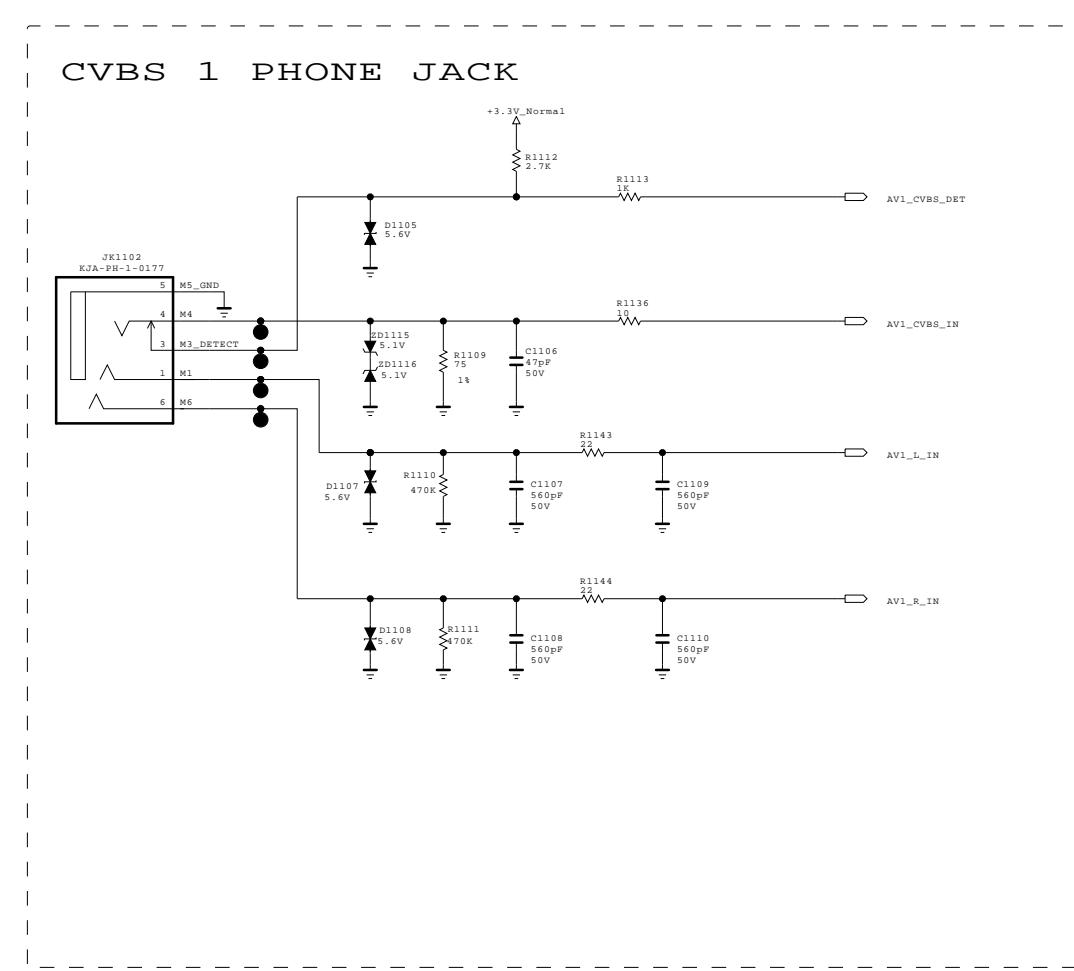


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MODEL	BCM35230	DATE	
BLOCK	WIRELESS	SHEET	10 / 50



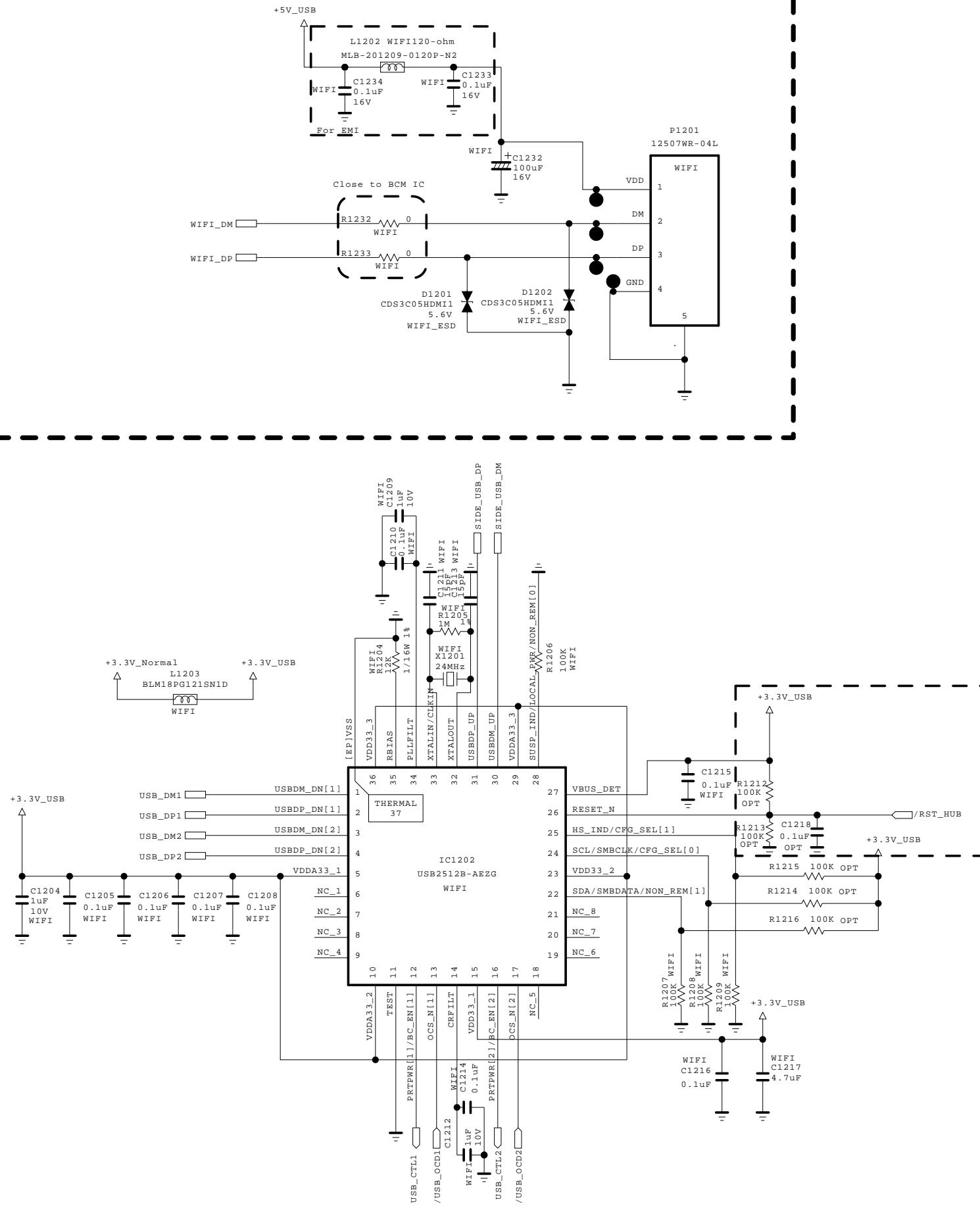
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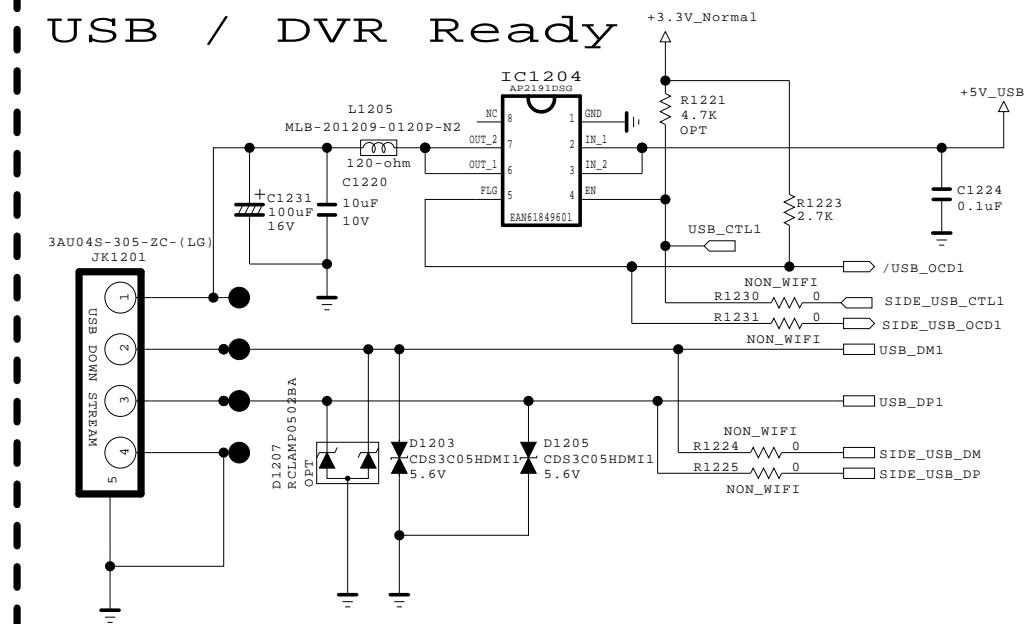
MODEL	BCM35230	DATE	
BLOCK	COMP/AV	SHEET	11 / 50

USB_WIFI

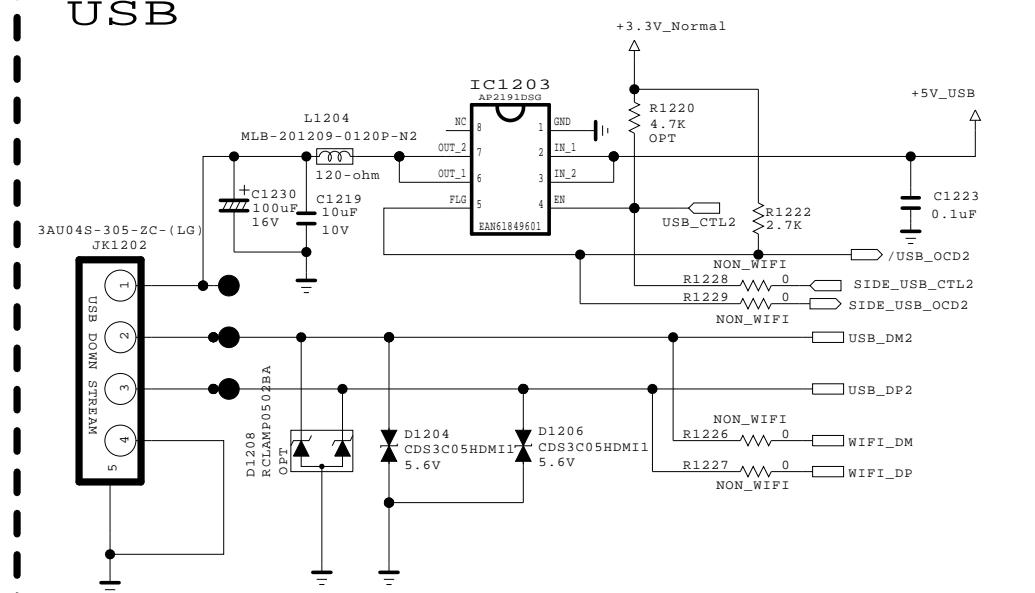


DUAL COMPONENT	
D1201, D1202 D1203, D1204 D1205, D1206	1ST : EAH42720601 2ND : EAH60994401

USB / DVR Ready



USB



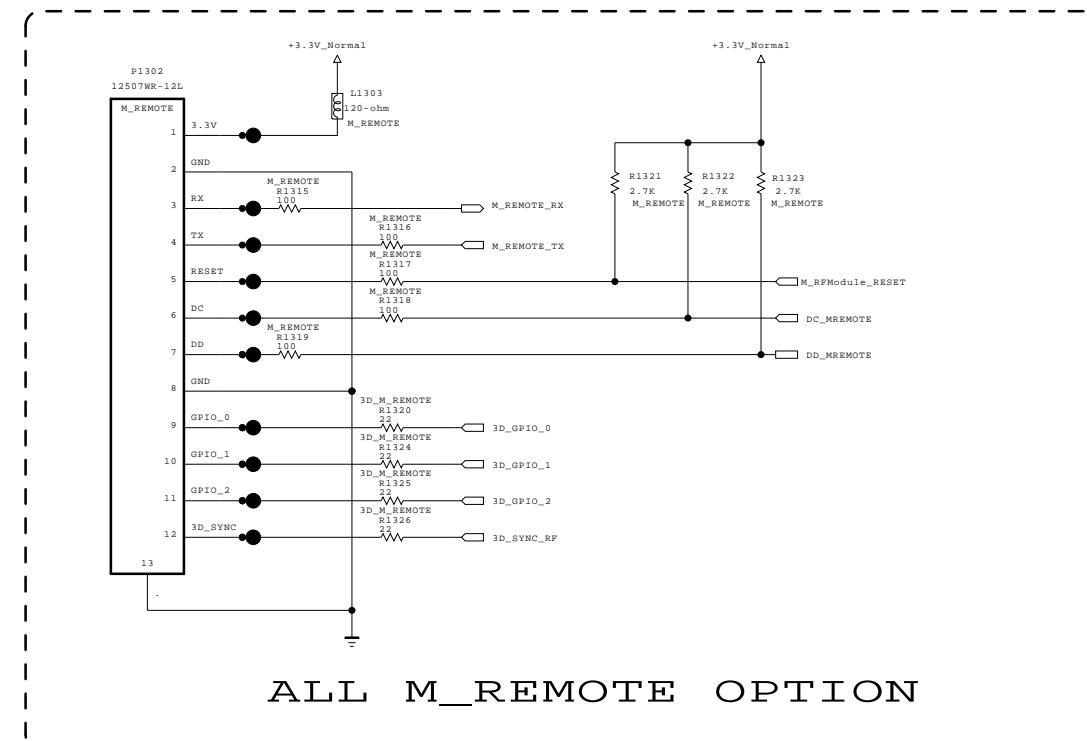
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MODEL BLOCK	BCM35230 USB + WIFI	DATE SHEET
		12

TI solution M_REMOTE OPTION



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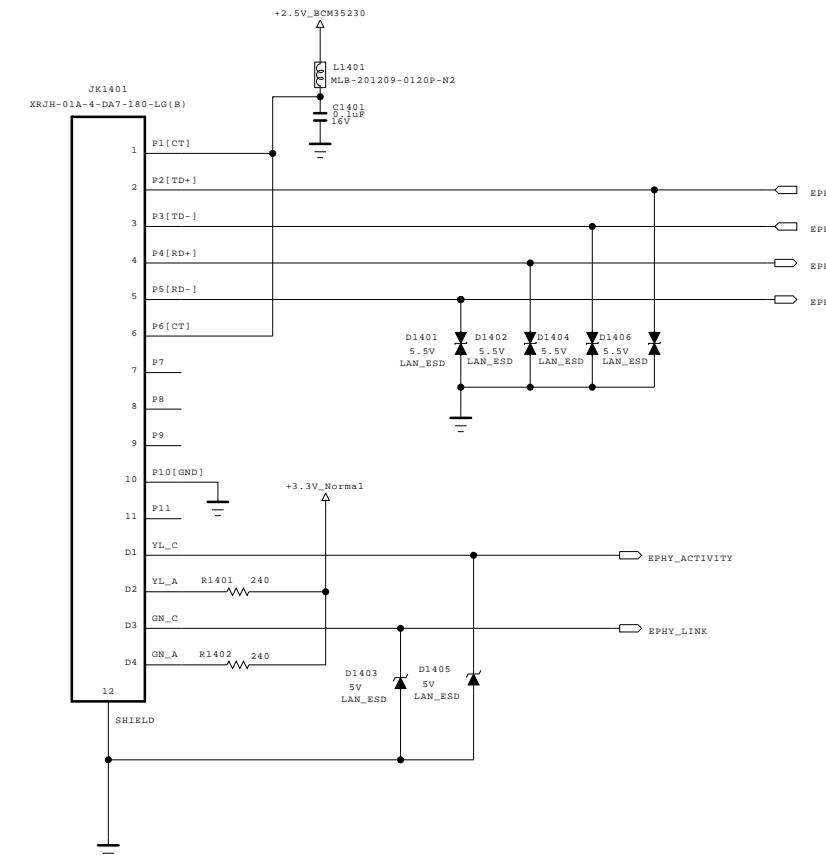
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MODEL	BCM35230	DATE	
BLOCK	M_REMOTECON	SHEET	13 / 50

Ethernet Block

DUAL COMPONENT	
D1401, D1402 D1403, D1404 D1405, D1406	1ST : EAH42720601 2ND : EAH60994401



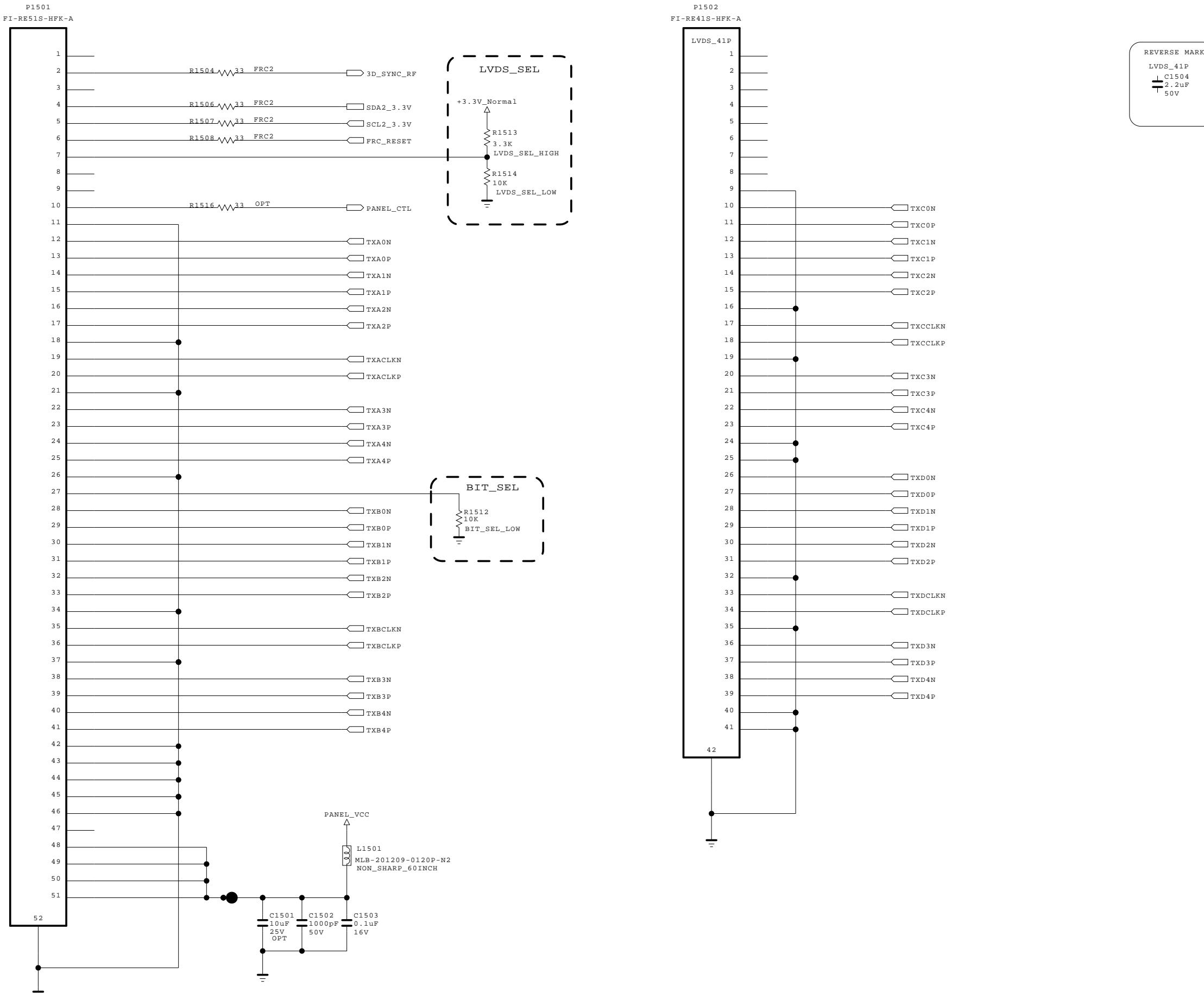
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MODEL BLOCK	BCM35230 ETHERNET	DATE SHEET	
14	50		

FHD120Hz LVDS output (51pin+41Pin)



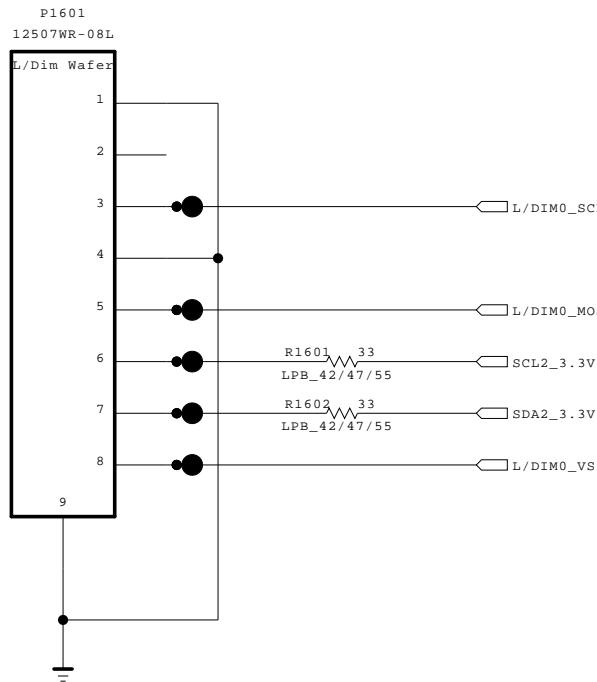
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SECRET
LG Electronics

LG ELECTRONICS

MODEL	BCM35230	DATE	2010.11.03
BLOCK	LVDS	SHEET	15 / 50

[Local Dimming Block]

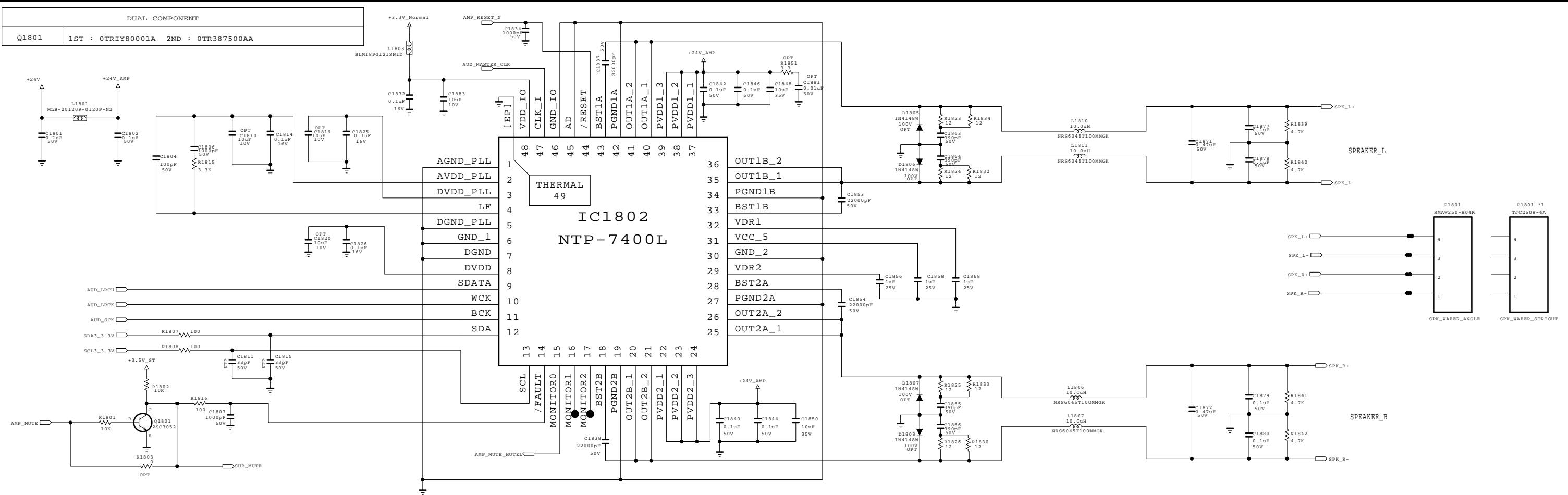


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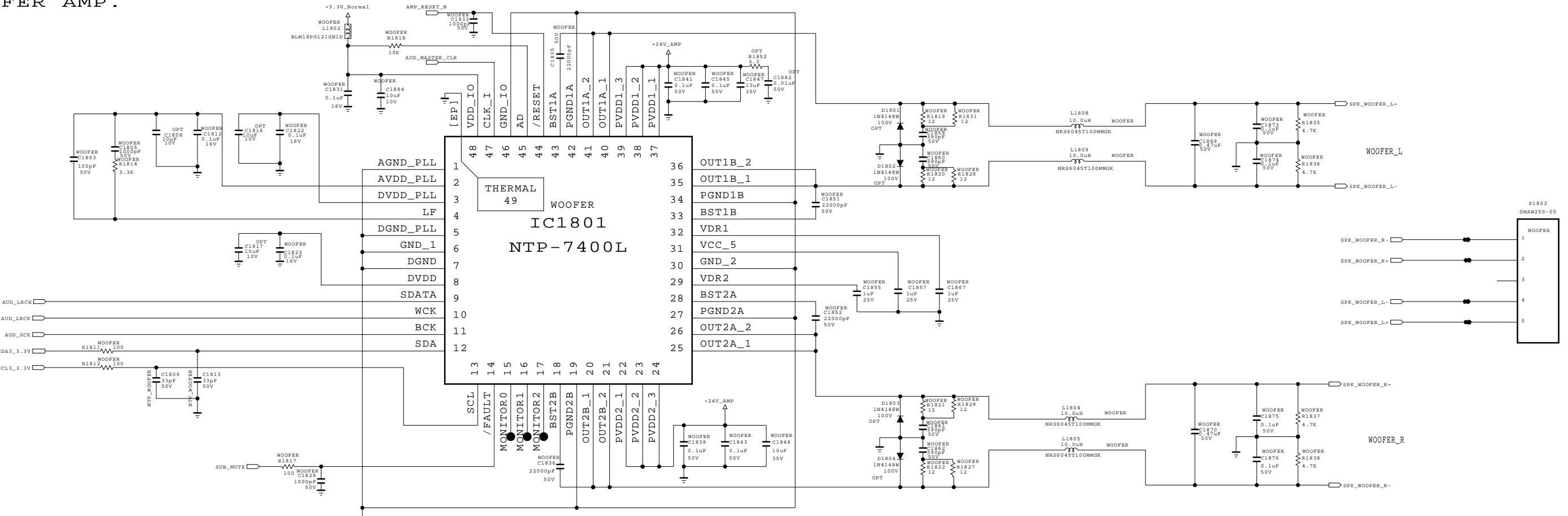
SECRET
LG Electronics

 LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	L_DIMMING	SHEET	16 / 50



WOOFER AMP.



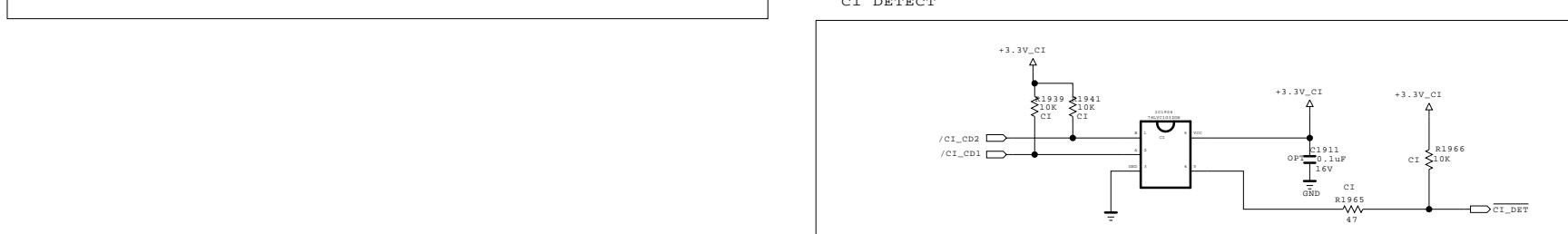
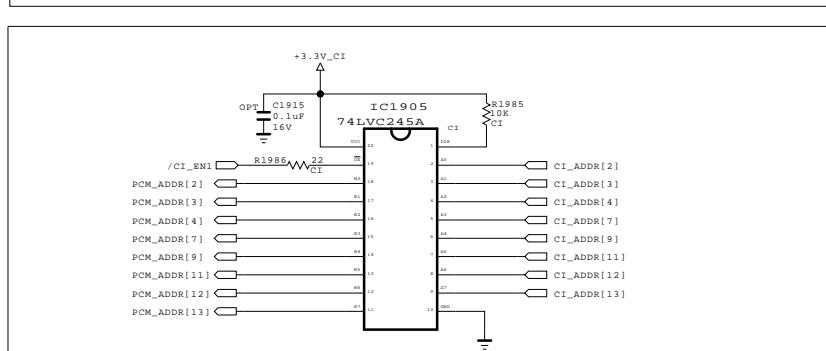
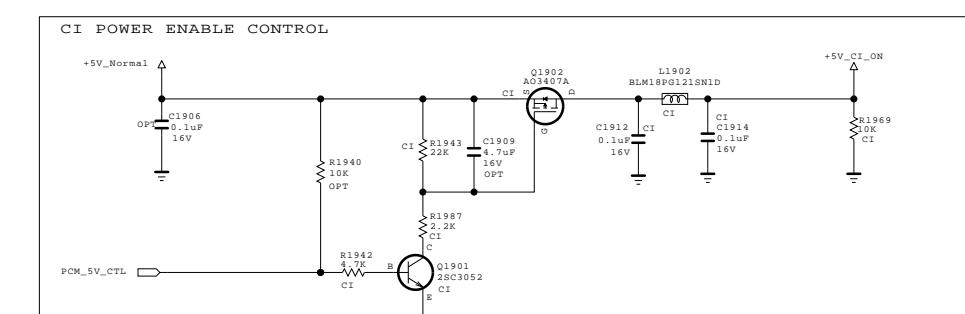
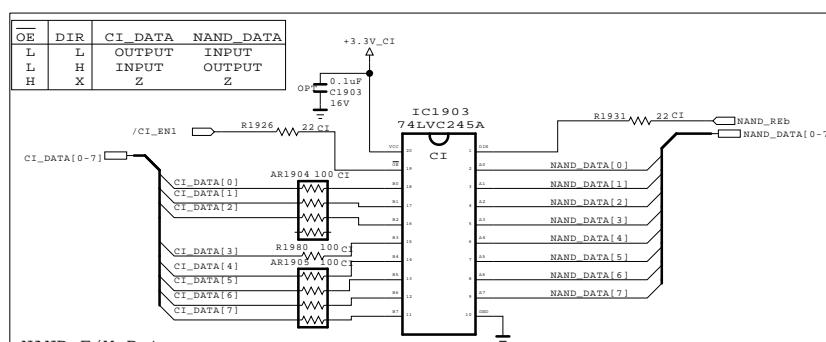
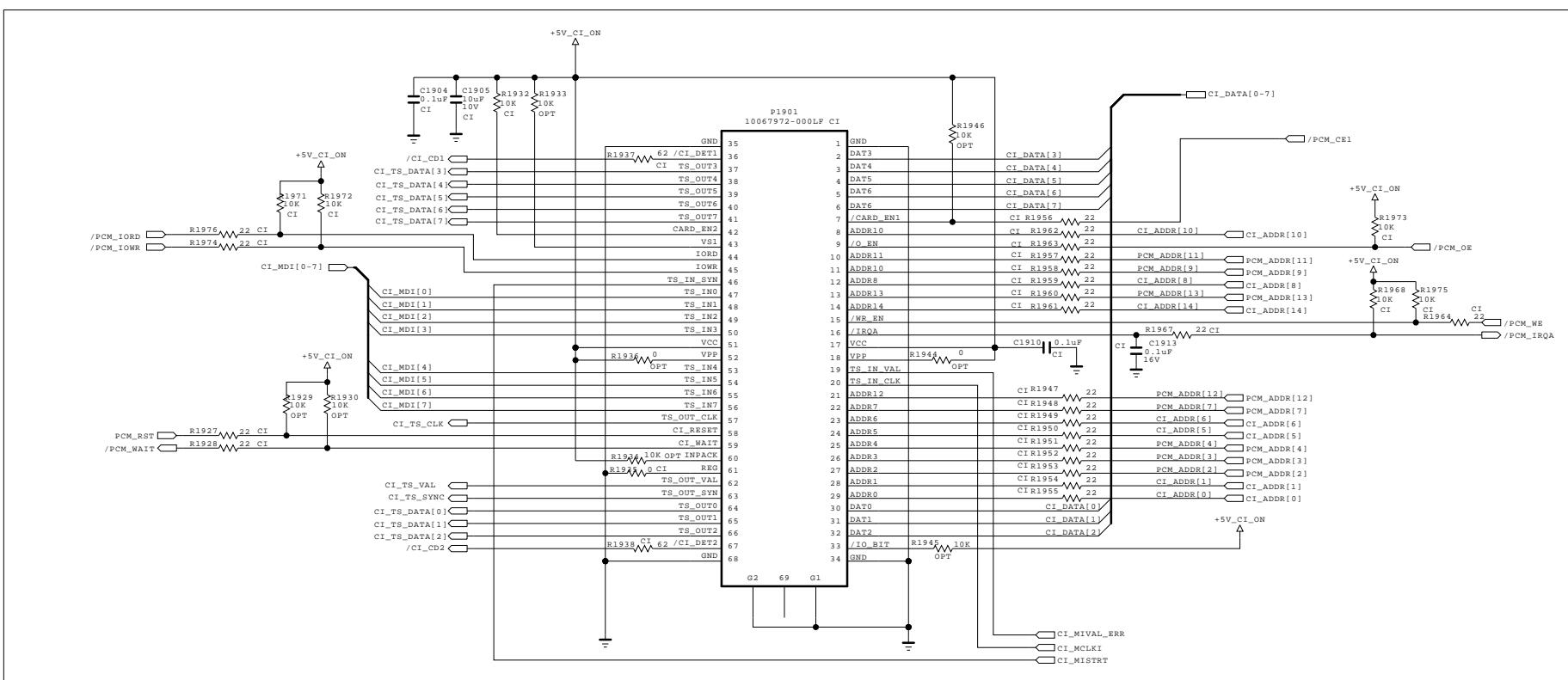
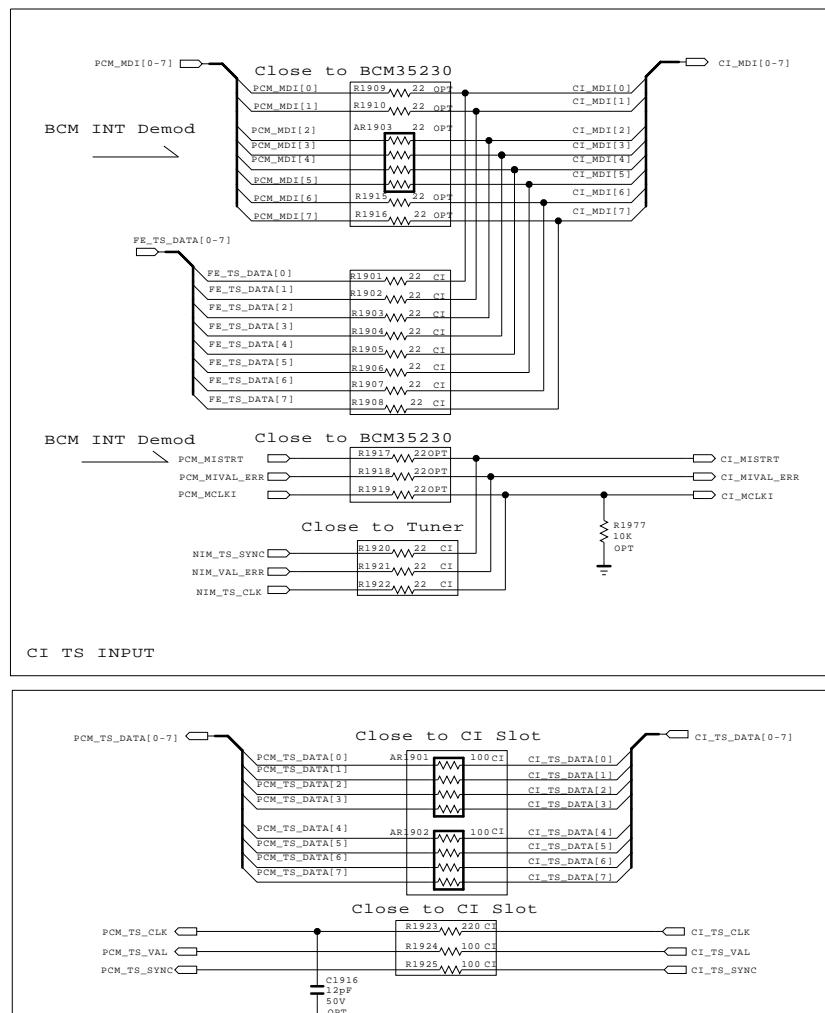
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SECRET
LG Electronics



MODEL	BCM35230	DATE	
BLOCK	AUDIO[NEO]	SHEET	18 / 50

DUAL COMPONENT	
Q1901	1ST : OTRIY80001A 2ND : OTR387500AA
Q1902	1ST : EBK60752501, 2ND : EBK61011501
IC1904	1ST : OISTLPH062A, 2ND : EAN40055001



THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

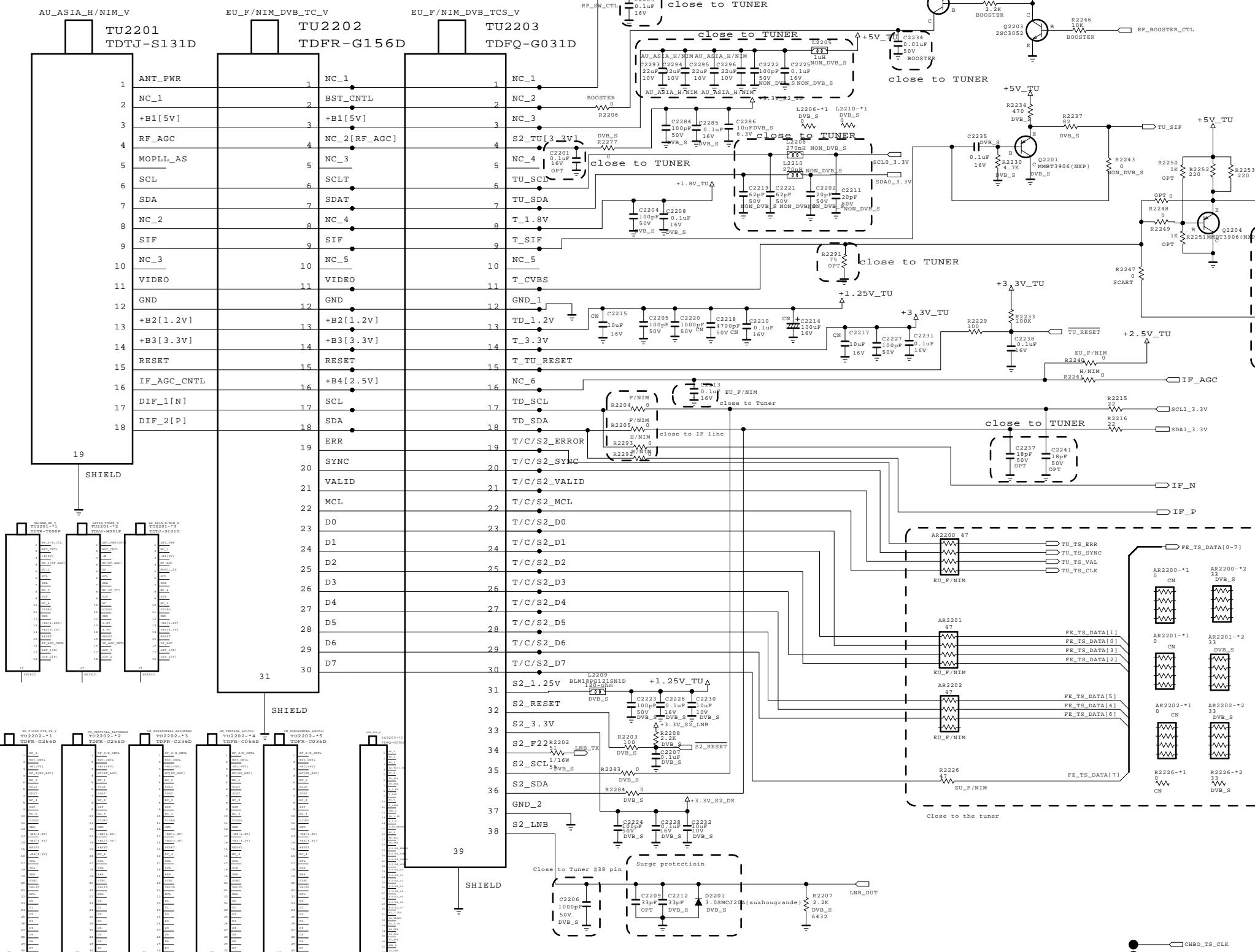
SECRET
LG Electronics

LG ELECTRONICS

MODEL	BCM35230	DATE	2010.11.11
BLOCK	CI	SHEET	19 / 58

H/NIM & F/NIM & T/C/S2 Combo Tuner

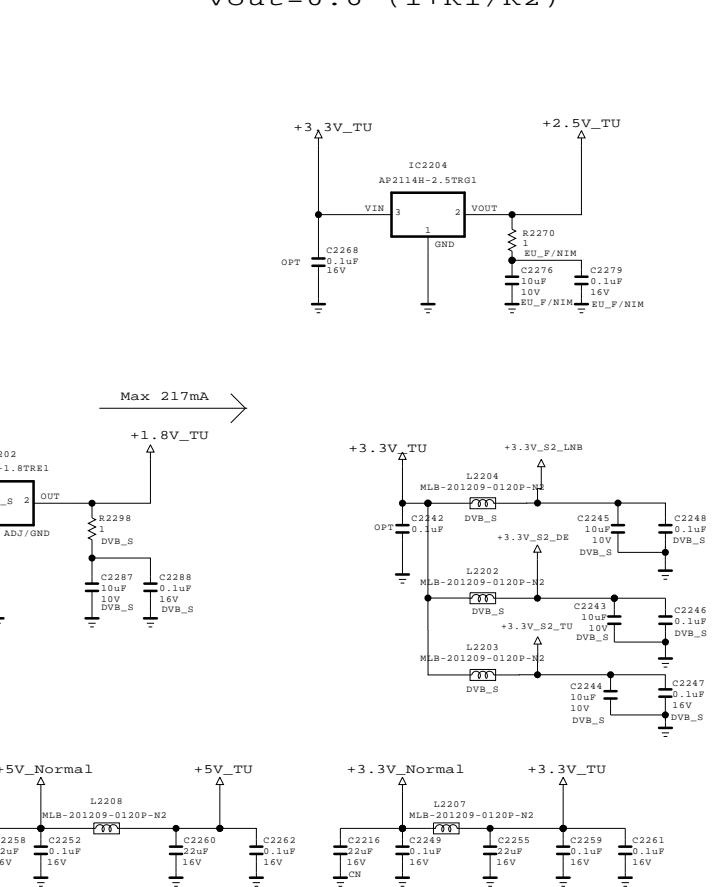
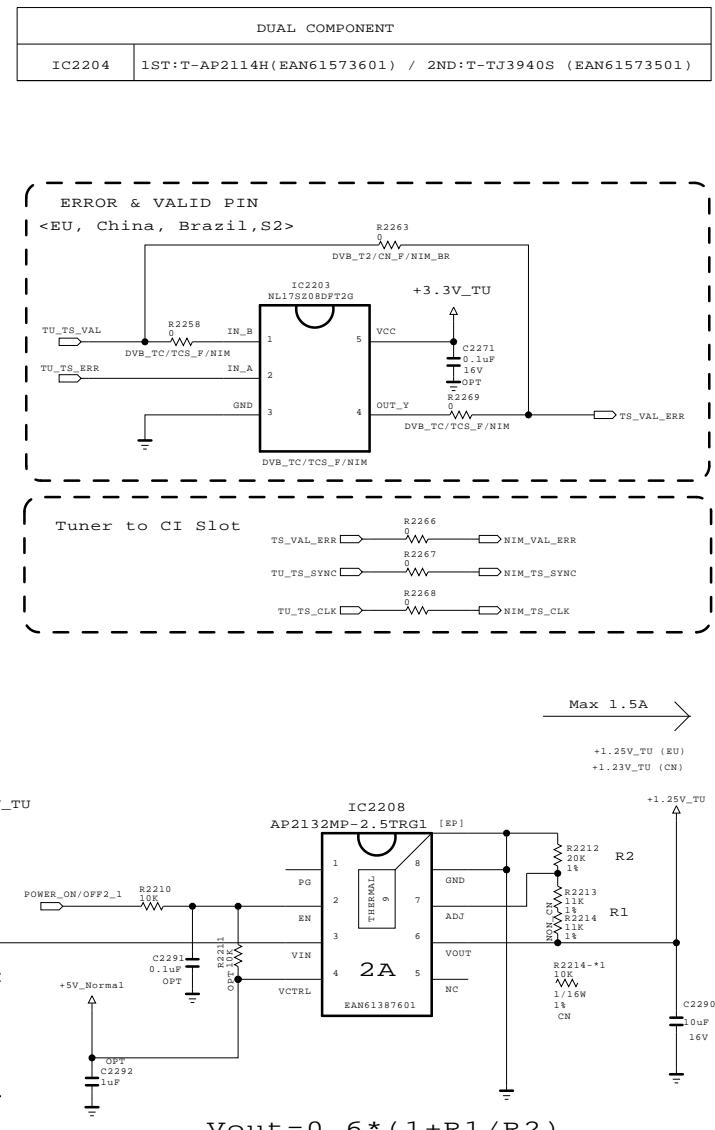
OPTION TABLE					
H/NIM (EU)	H/NIM (AU, Latin)	H/NIM (Brazil, Taiwan)	F/NIM_T/C	F/NIM_T2	F/NIM_CN
Non_DVB_S	Non_DVB_S	Non_DVB_S	Non_DVB_S	Non_DVB_S	Non_DVB_S
H/NIM	H/NIM	H/NIM	F/NIM	F/NIM	F/NIM
BOOSTER	BOOSTER	BOOSTER	BOOSTER	BOOSTER	SCART
SCART	SCART	SCART	CN	RF_SW_CTL	RF_SW_CTL
EU_F/NIM	EU_F/NIM	EU_F/NIM	EU_F/NIM	EU_F/NIM	EU_F/NIM
TC_S_F/NIM	TC_S_F/NIM	CN_P/NIM_BR	CN_P/NIM_BR	CN_P/NIM_BR	TC_S_F/NIM



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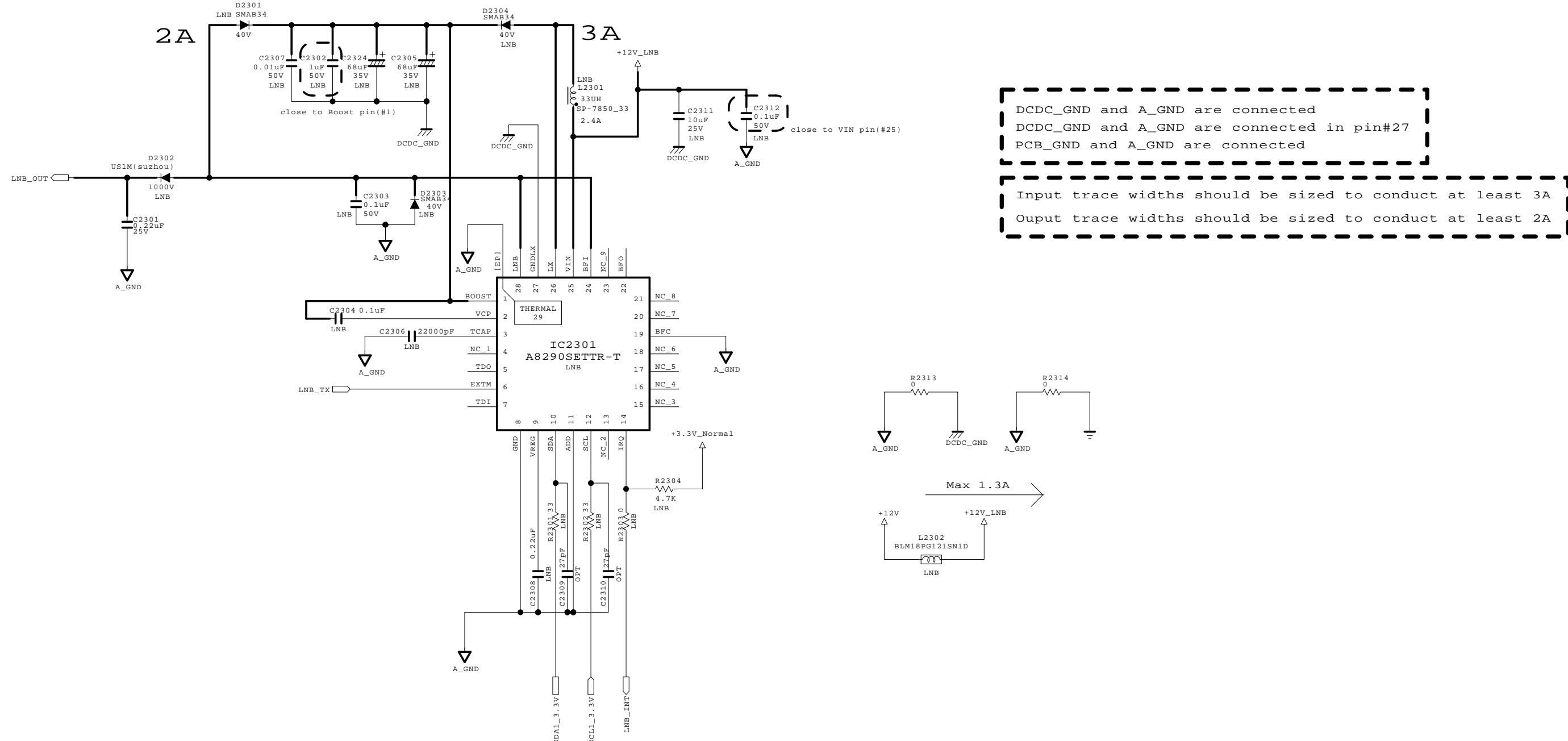
LG ELECTRONICS



MODEL	BCM35230	DATE
BLOCK	TUNER SINGLE	SHEET

DVB-S2 LNB Part Allegro

(Option: LNB)



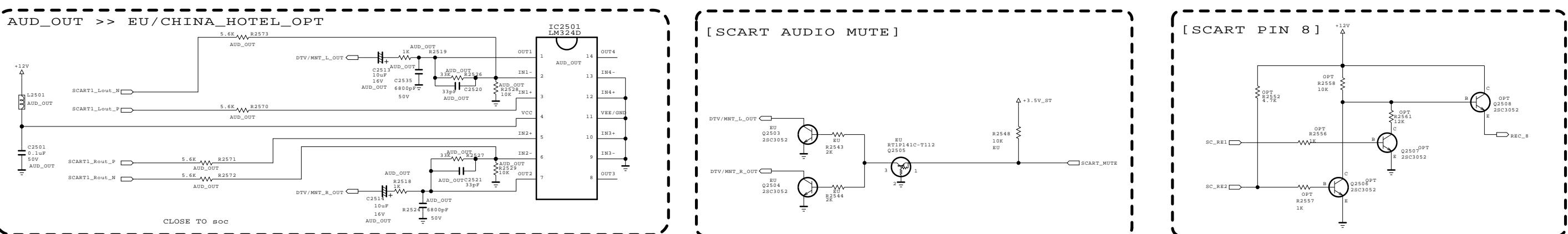
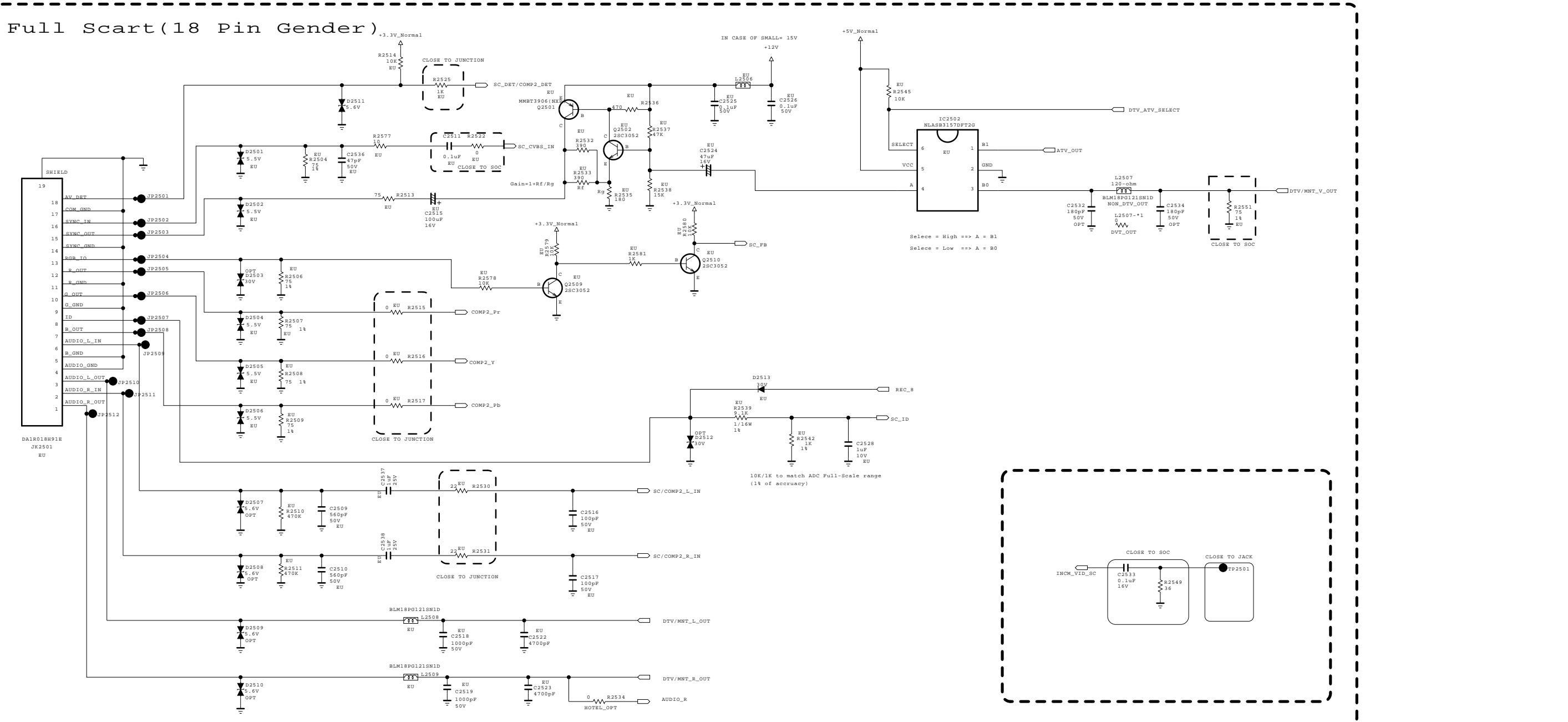
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. IT IS ESSENTIAL THAT ONLY MANUFACTURED SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

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LG Electronics

LG ELECTRONICS

MODEL BLOCK	BCM35230	DATE SHEET	2010.11.02
	LNB		23 / 57

DUAL COMPONENT			
Q2503, Q2504, Q2506, Q2507, Q2508	1ST : OTRIY80001A	2ND : OTR387500AA	
Q2501	1ST : EBK61012701	2ND : EBK58172301	
Q2505	1ST : OTRIH80004A	2ND : EBK61012501, 3RD : OTR102009AM	
D2513	1ST : T-BAT54_SUZHO	2ND : ODS000138A	



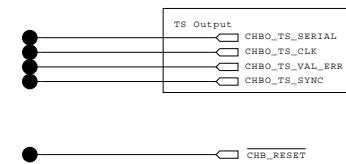
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LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	SCART	SHEET	25

NON CHB



THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

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LG Electronics

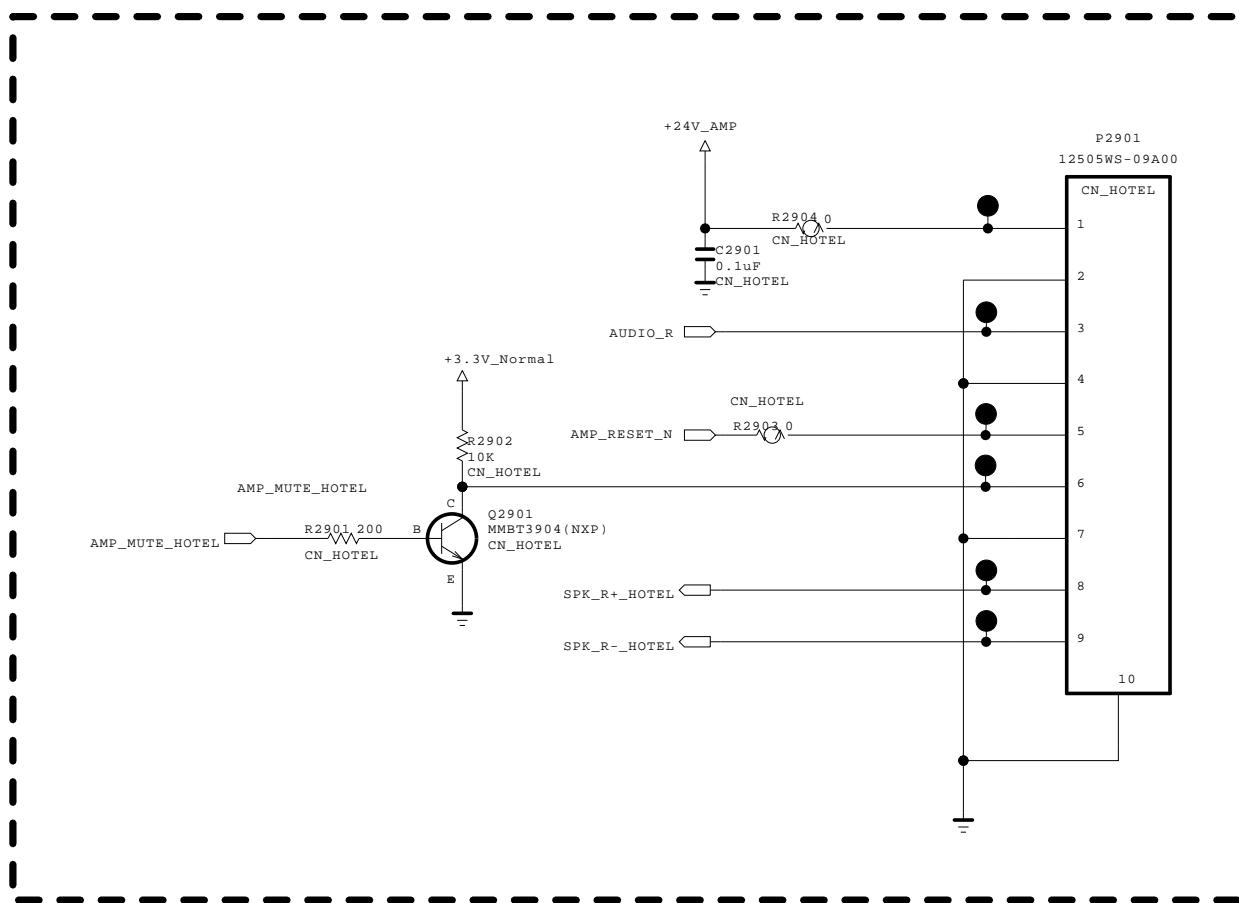
 LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	NON CHB	SHEET	28 / 50

China Hotel Option

DUAL COMPONENT

Q2901 1ST : EBK61012601 2ND : OTRDI80002A

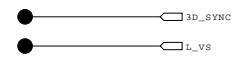


THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

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LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	CHINA HOTEL	SHEET	29



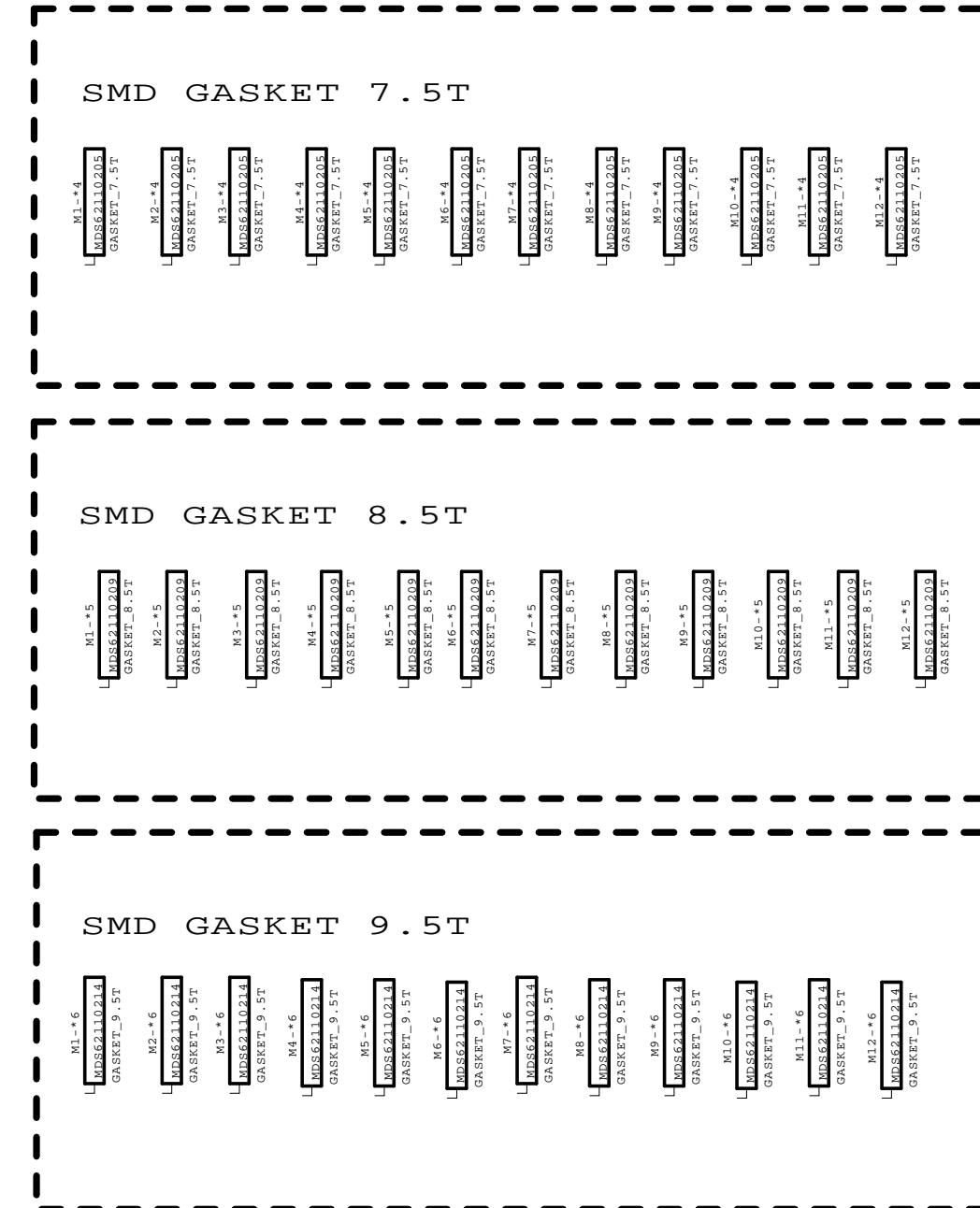
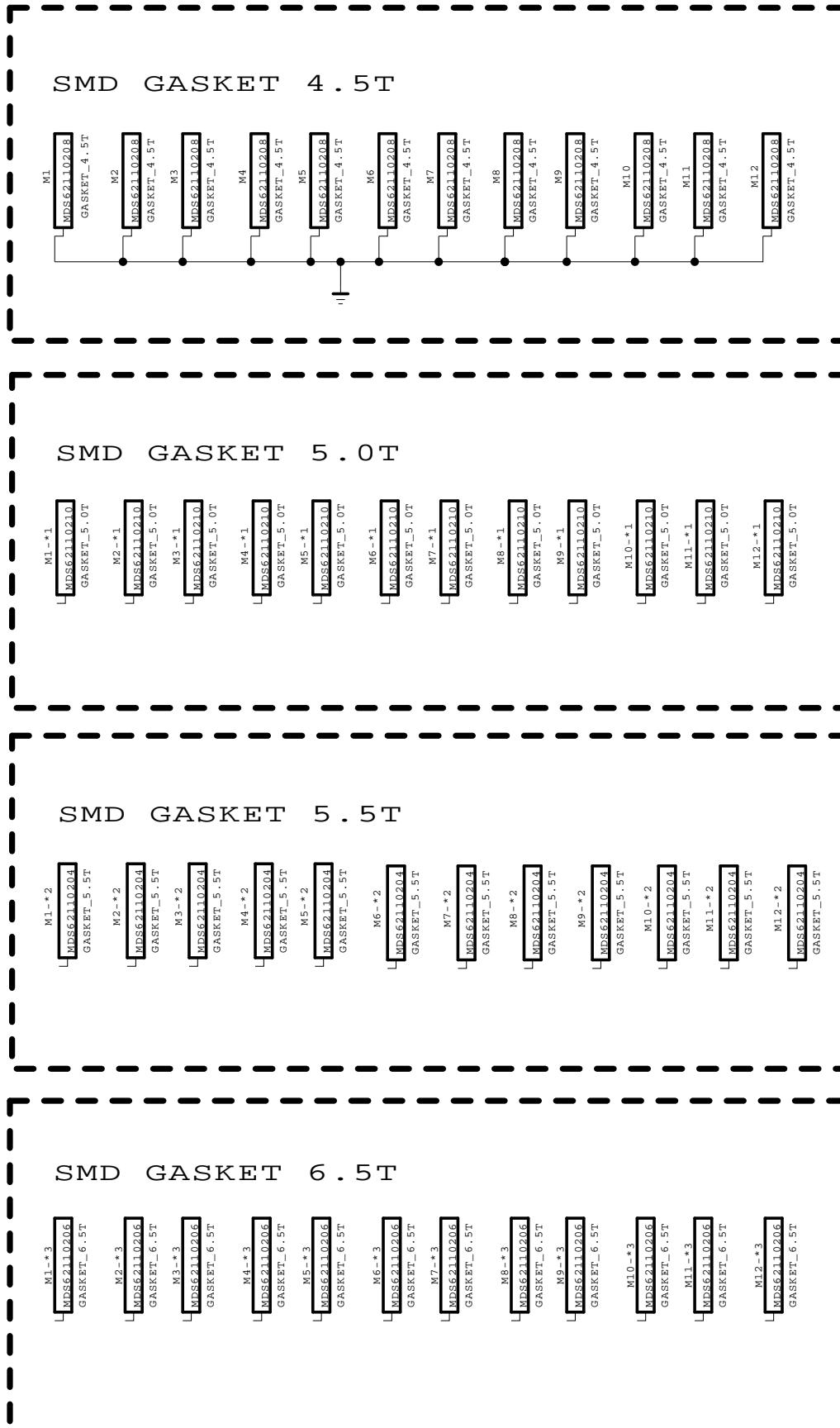
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

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MODEL	BCM35230	DATE	
BLOCK	NON URSA	SHEET	36 / 50

SMD GASKET



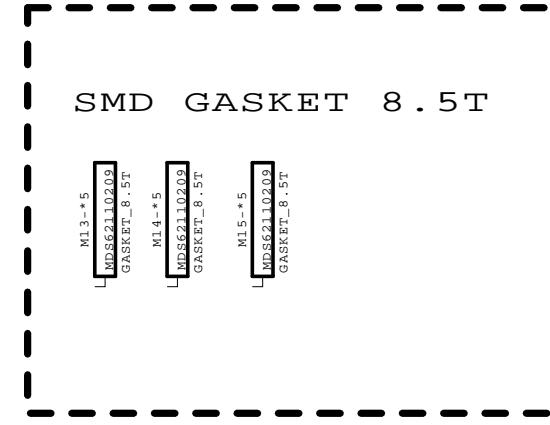
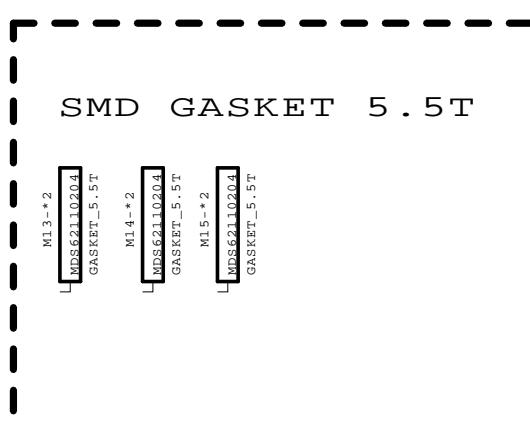
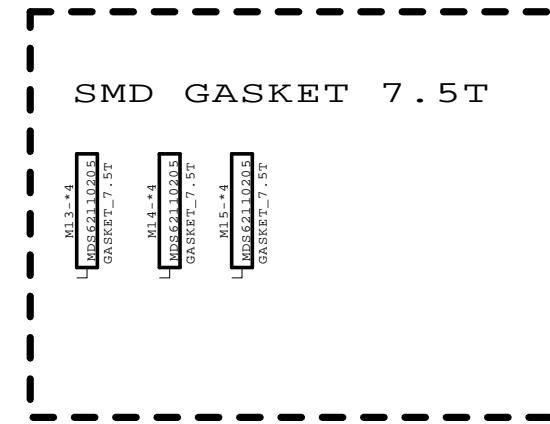
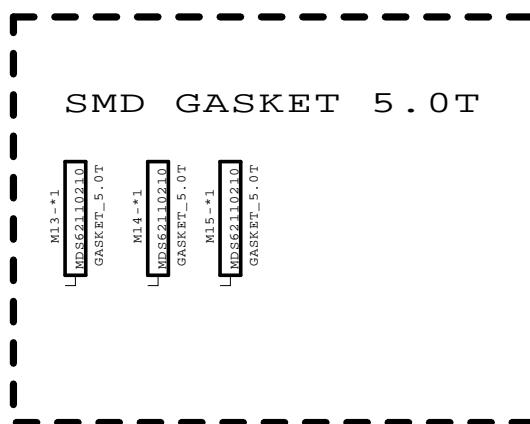
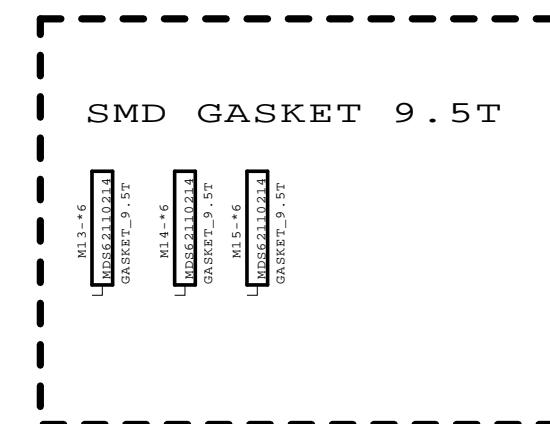
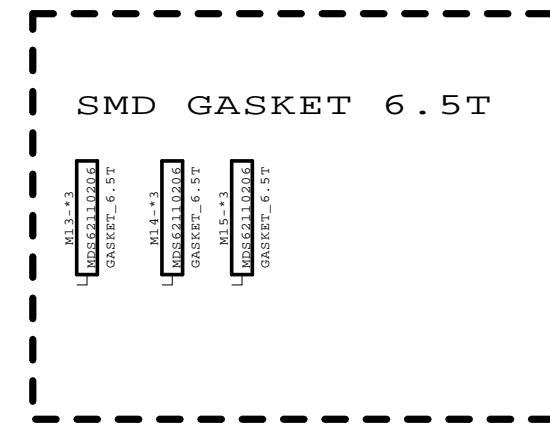
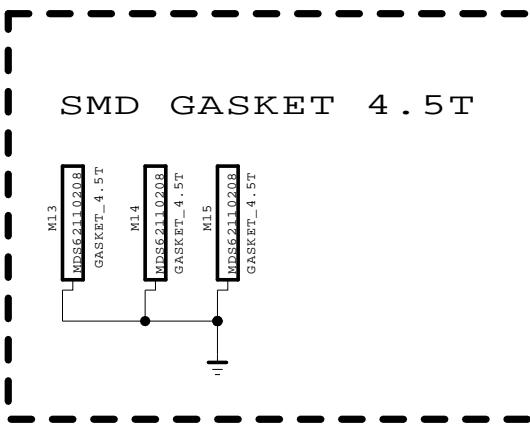
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MODEL BLOCK	BCM35230	DATE	2010. 09. 18
	SMD GASKET	SHEET	56 / 56

SMD GASKET (UNDER THE TUNER)

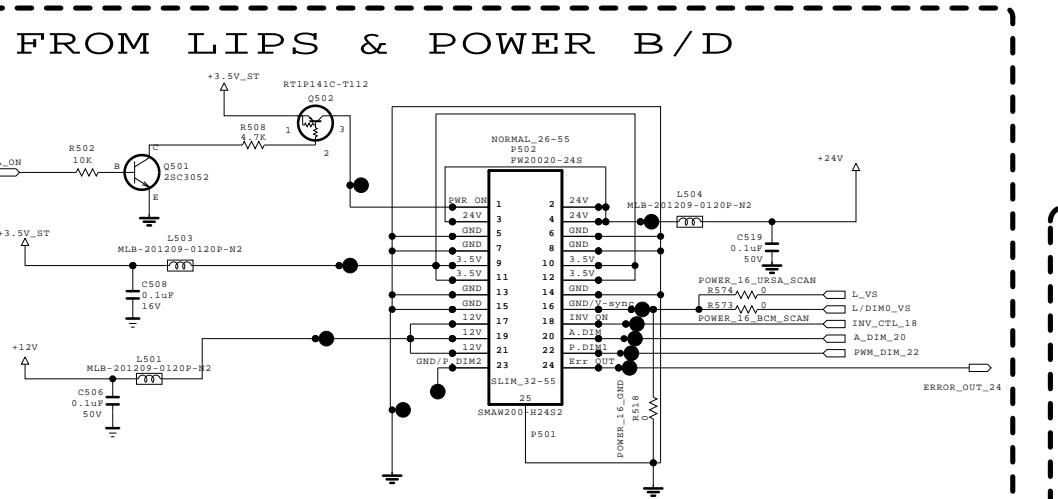


THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. IT IS ESSENTIAL THAT ONLY MANUFACTURED SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

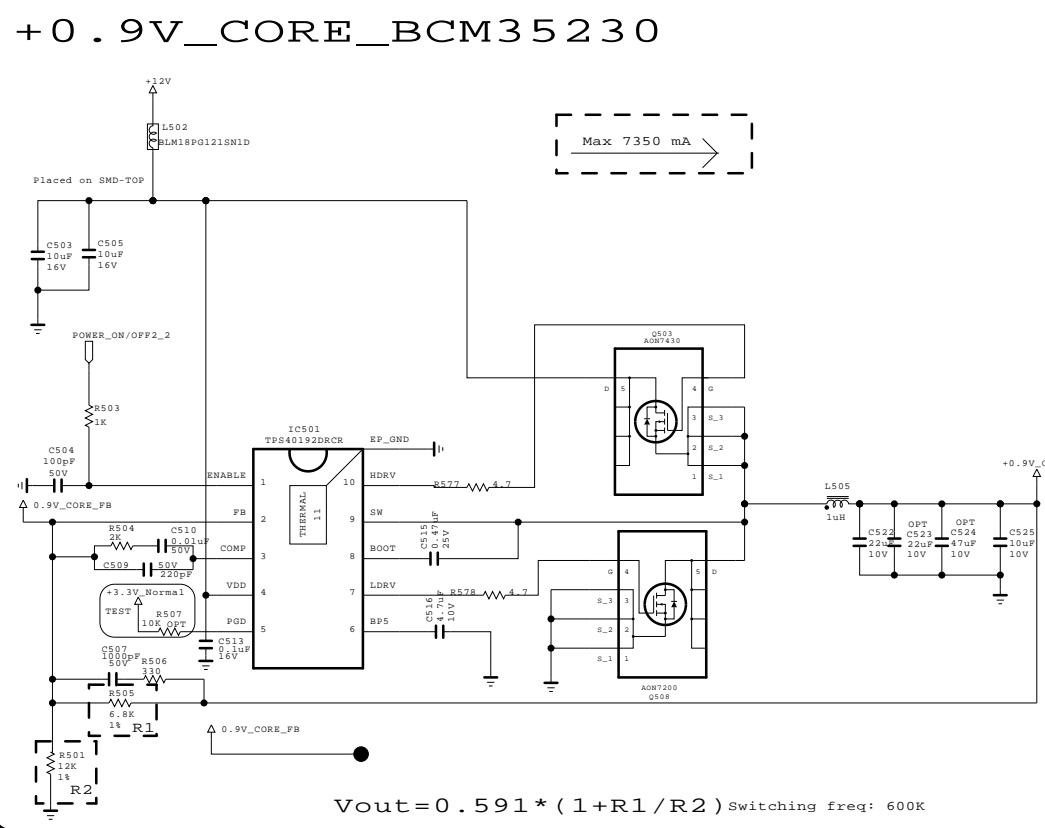
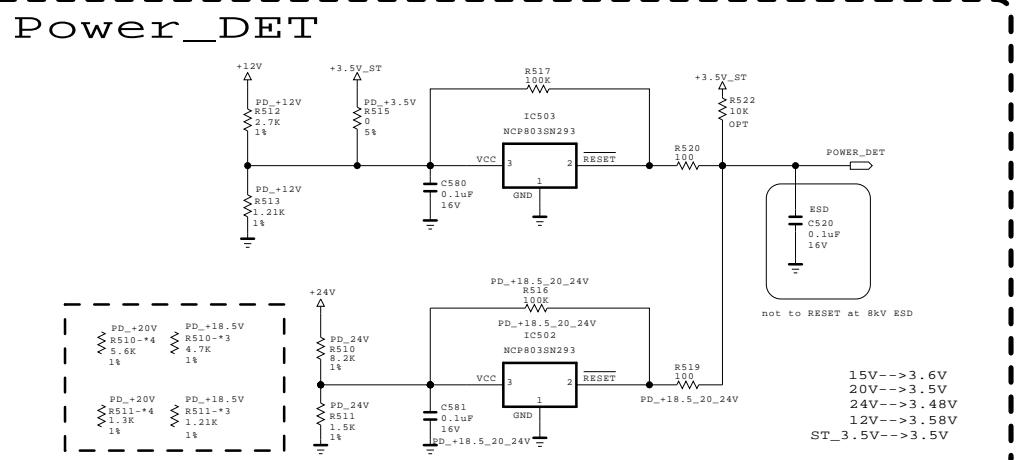
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MODEL BLOCK	BCM35230	DATE	2010. 09. 18
	TUNER SMD GASKET	SHEET	57 / 57

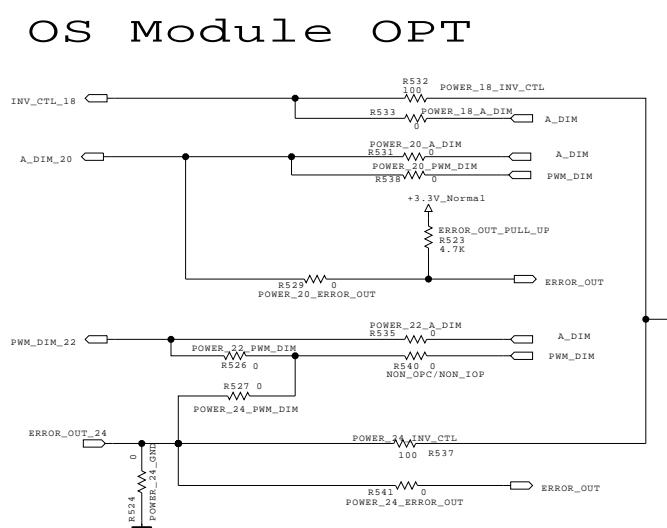
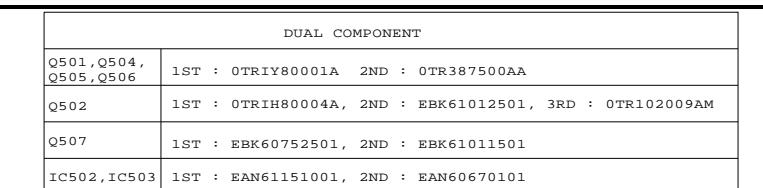


#16/#20/#23
LD - GND OR USE
LE(N.L.D.) - OPEN
LE(L.D.) - USE

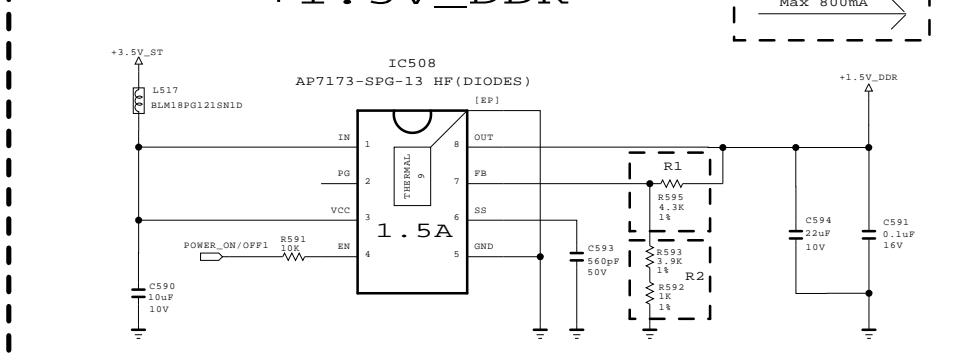
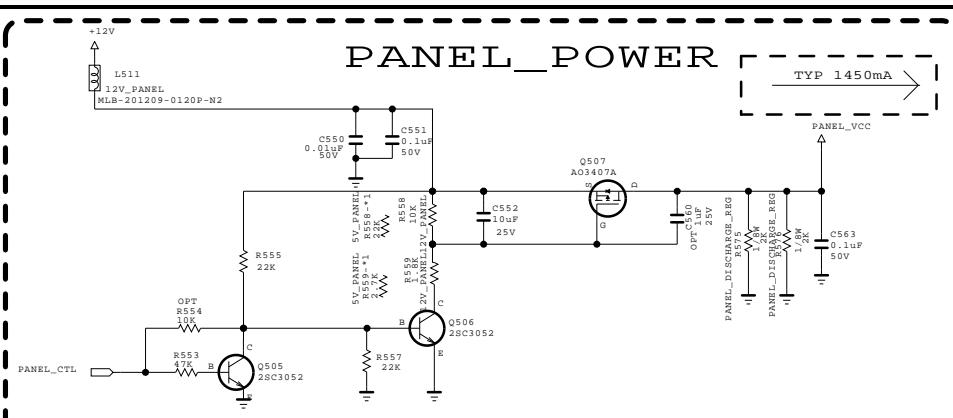
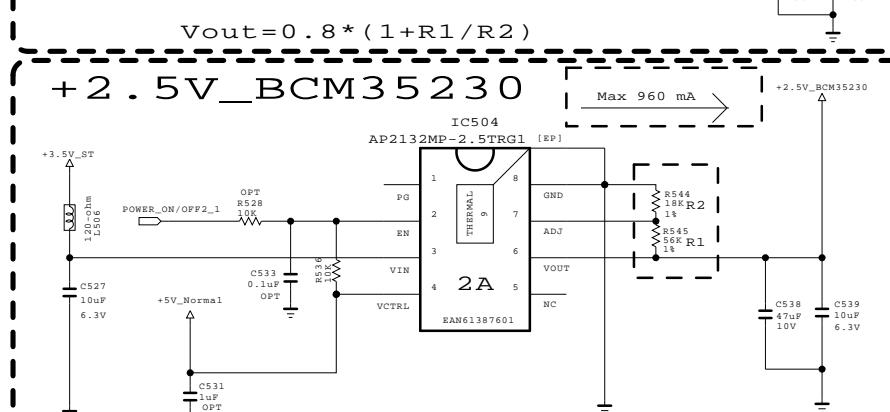
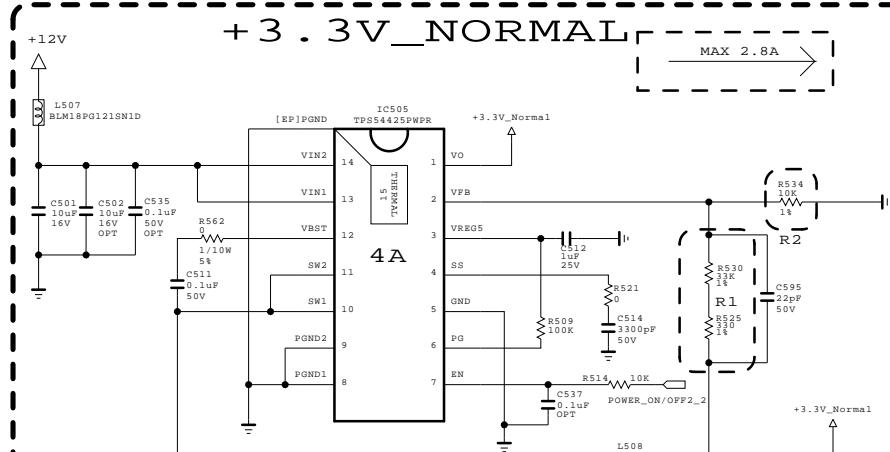


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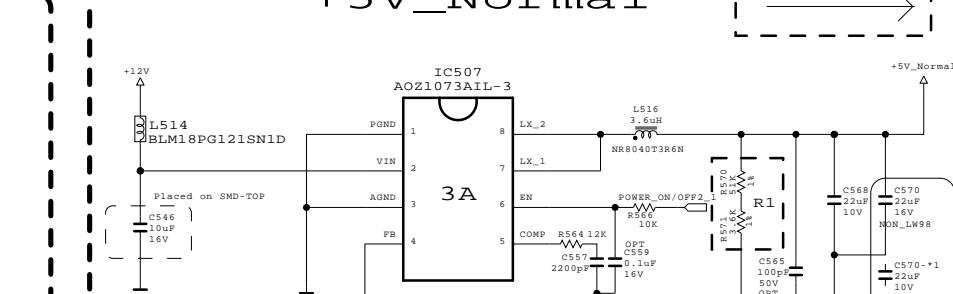
SECRET



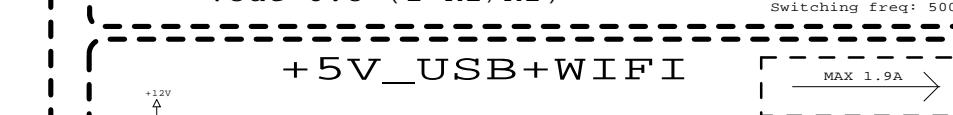
<OS MODULE PIN MAP>				
PIN NO	LGD	CMO (09)	AUO	SHARP
18	INV_ON	A-DIM	INV_ON	INV_ON
20	V4:VBR-A V5:NC	NC	Err_out	Err_out
22	PWM_DIM	PWM_DIM	A-DIM	PWM_DIM
24	Err_out LED:GND	INV_ON	PWM_DIM	GND



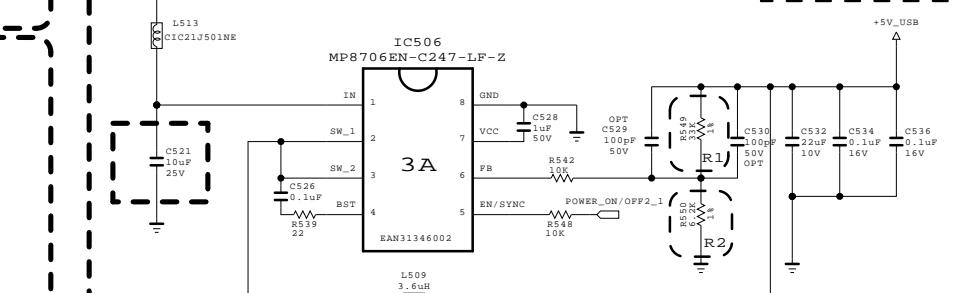
$$V_{out} = 0.8 * (1 + R1 / R2)$$



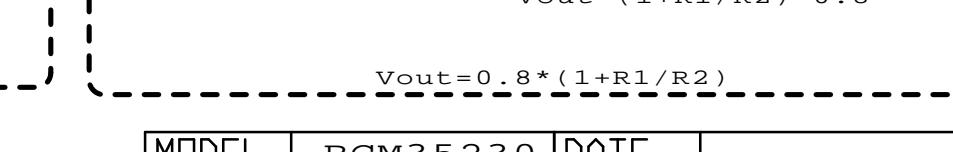
$$V_{out} = 0.8 * (1 + R1/R2)$$



— 54 —



$$Y_{out} = (1 + R1 / R2) * 0.8$$



$$V_{\text{OUI}} \equiv 0.8 * (1 + R1/R2)$$



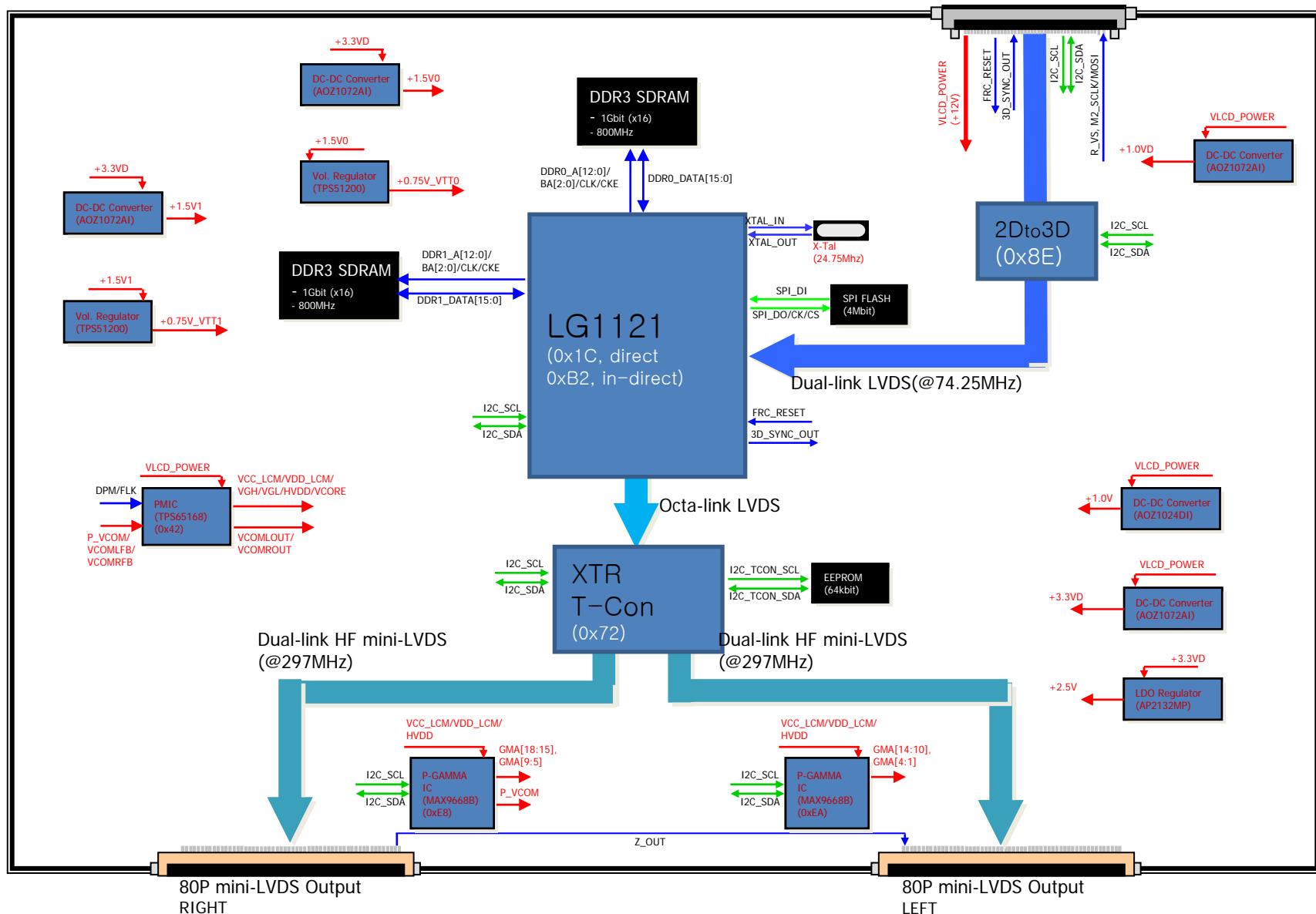
LG Electronics Inc.

LCD TV Repair Guide

‘11 years New Models

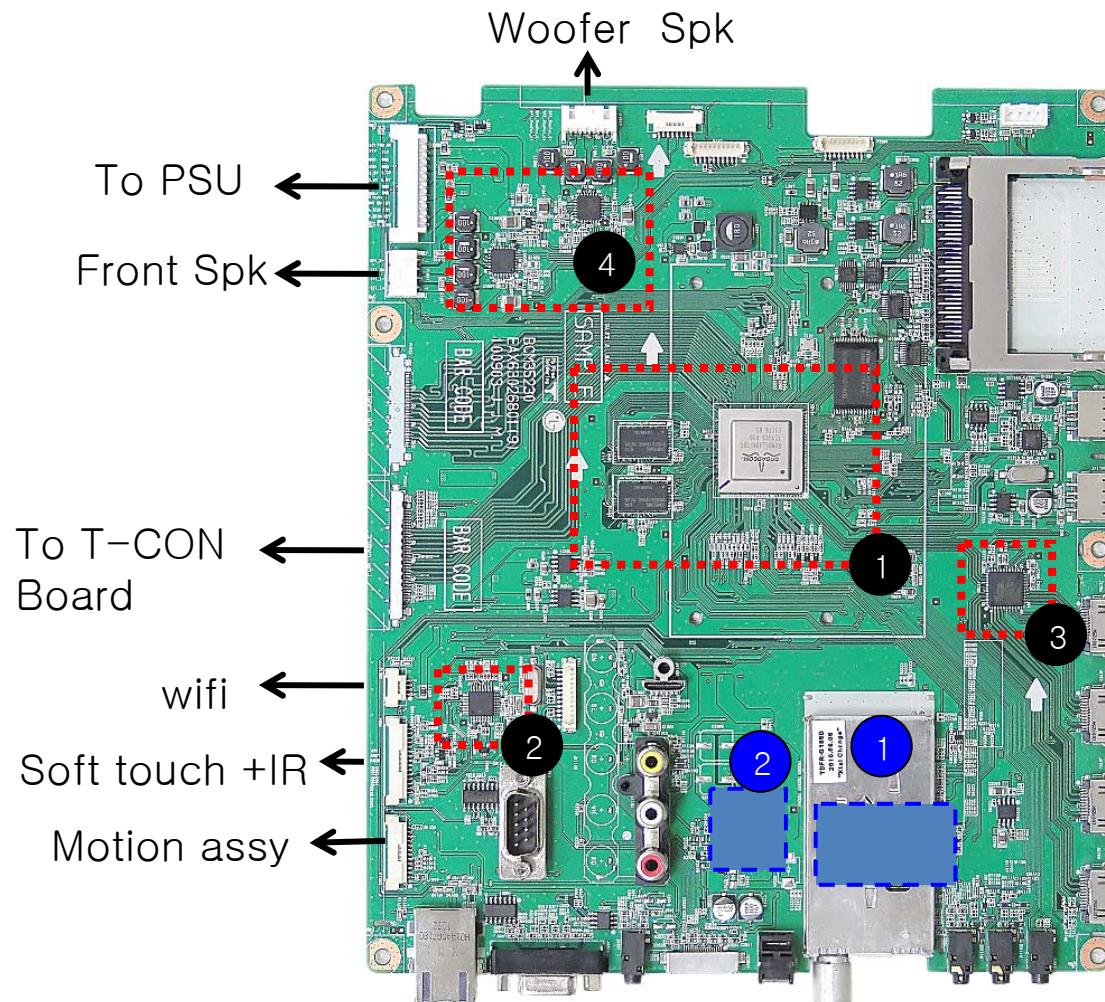
< Applicable Model >
LV770S/T/W/G-ZA

GP3 Backend block diagram (SG)

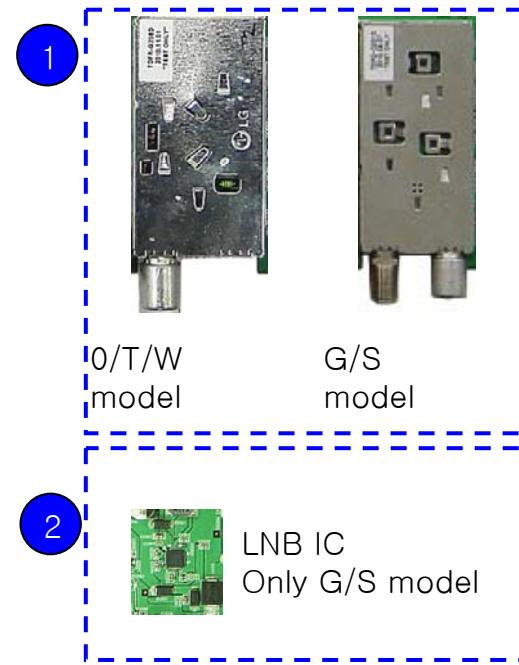


Main PCB for Smart TV

XXLW950T/W/G/S-ZA
XXLW770T/W/G/S-ZA



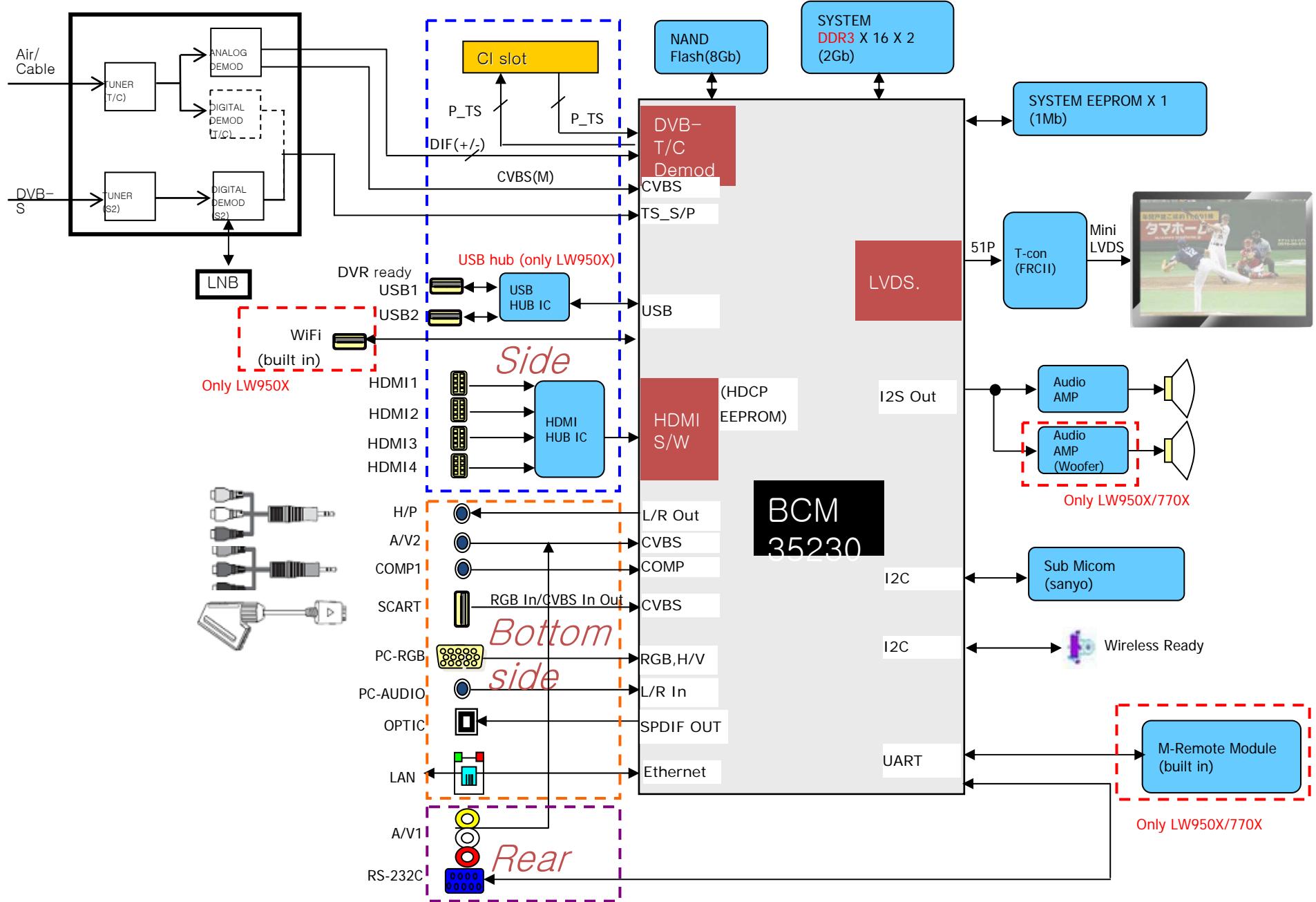
Main Board without T-con b'd



- 1: Main processor, DDR Memory, Flash Memory
- 2: Micom for Key/IR sensing
- 3: HDMI switch (4:1)
- 4: Audio AMP (10W+10W)

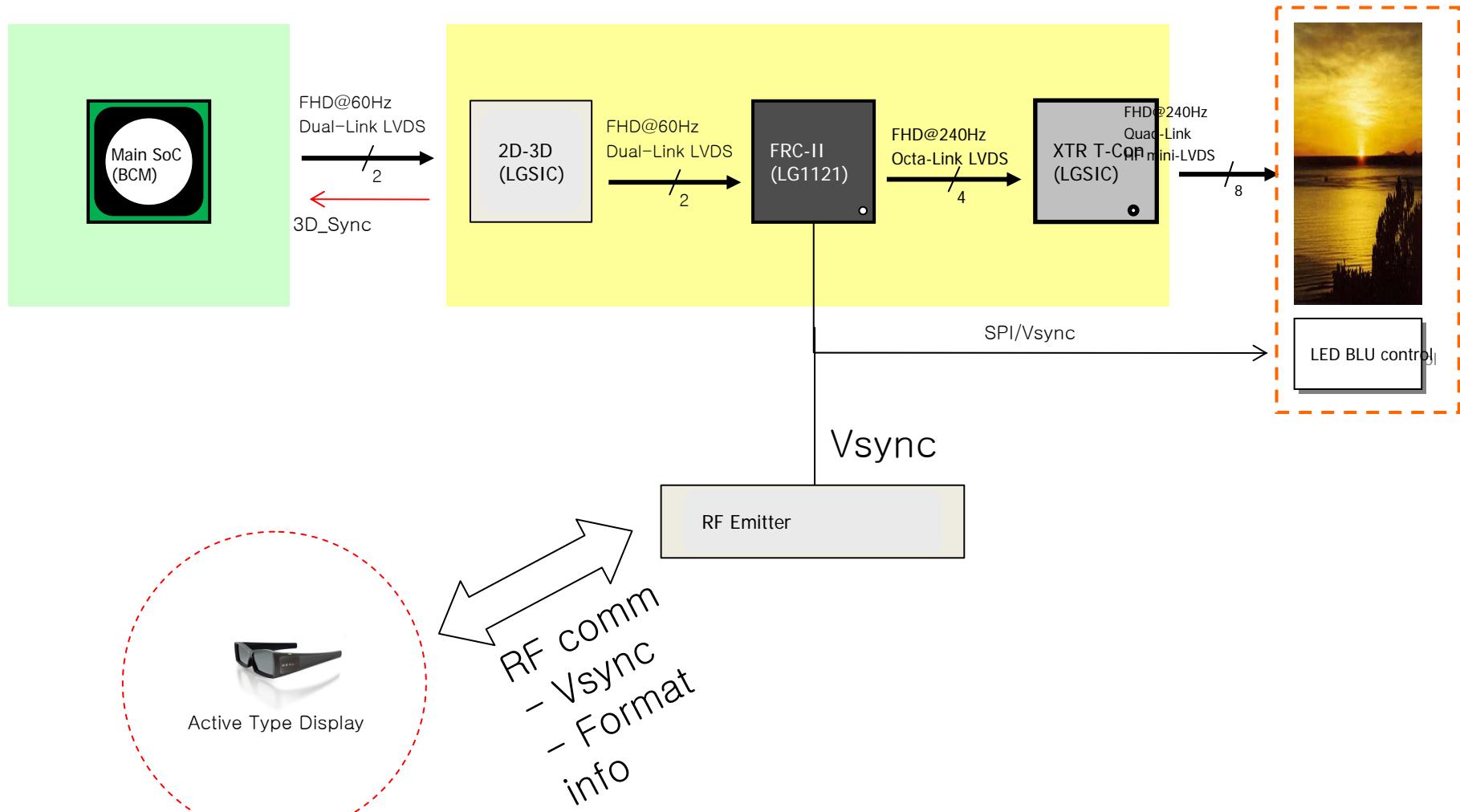
Tuner type can be changed by the model name.

BCM35230 Block Diagram (SGLW95/77, LV55/57)



Appendix. Block Diagram for Edge/ALEF Backlight

[All in one main PCB for [XXLW950T/W/S/G,XXLW770T/W/S/G](#) ALEF LED Backlight]

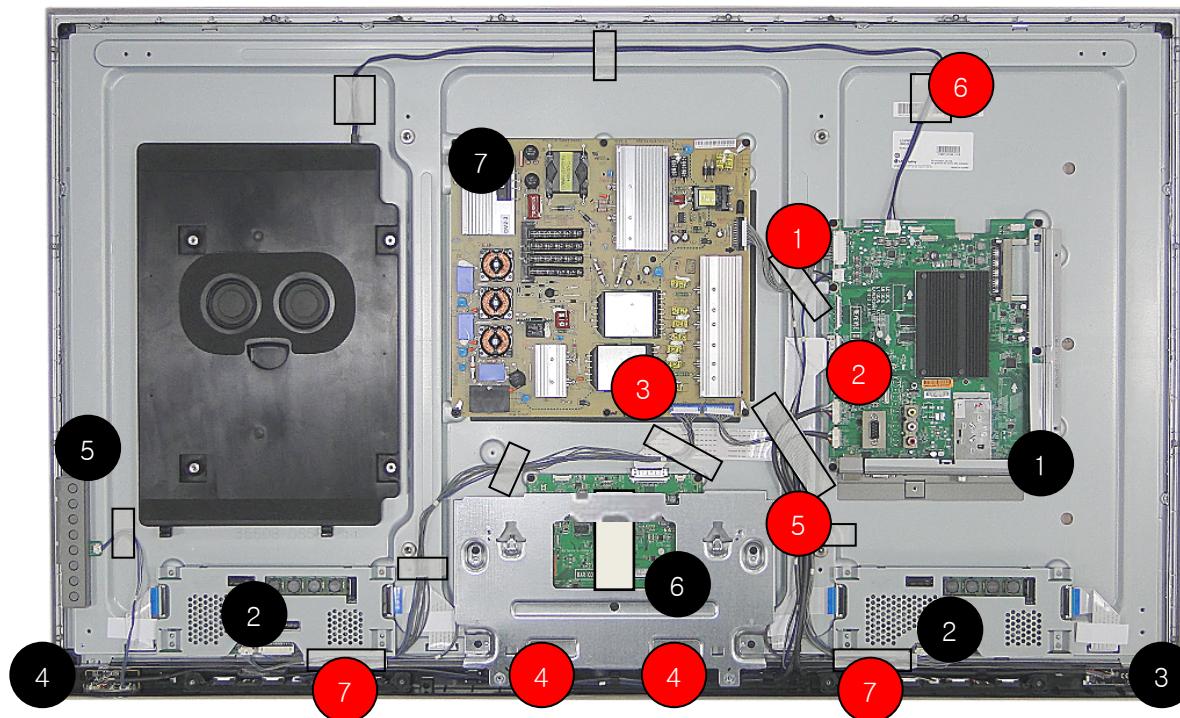


* For more information about 3D system, refer to the page 1 ~6

Interconnection – 2

XXLW770T/W/S/G-ZA

[PCBs]

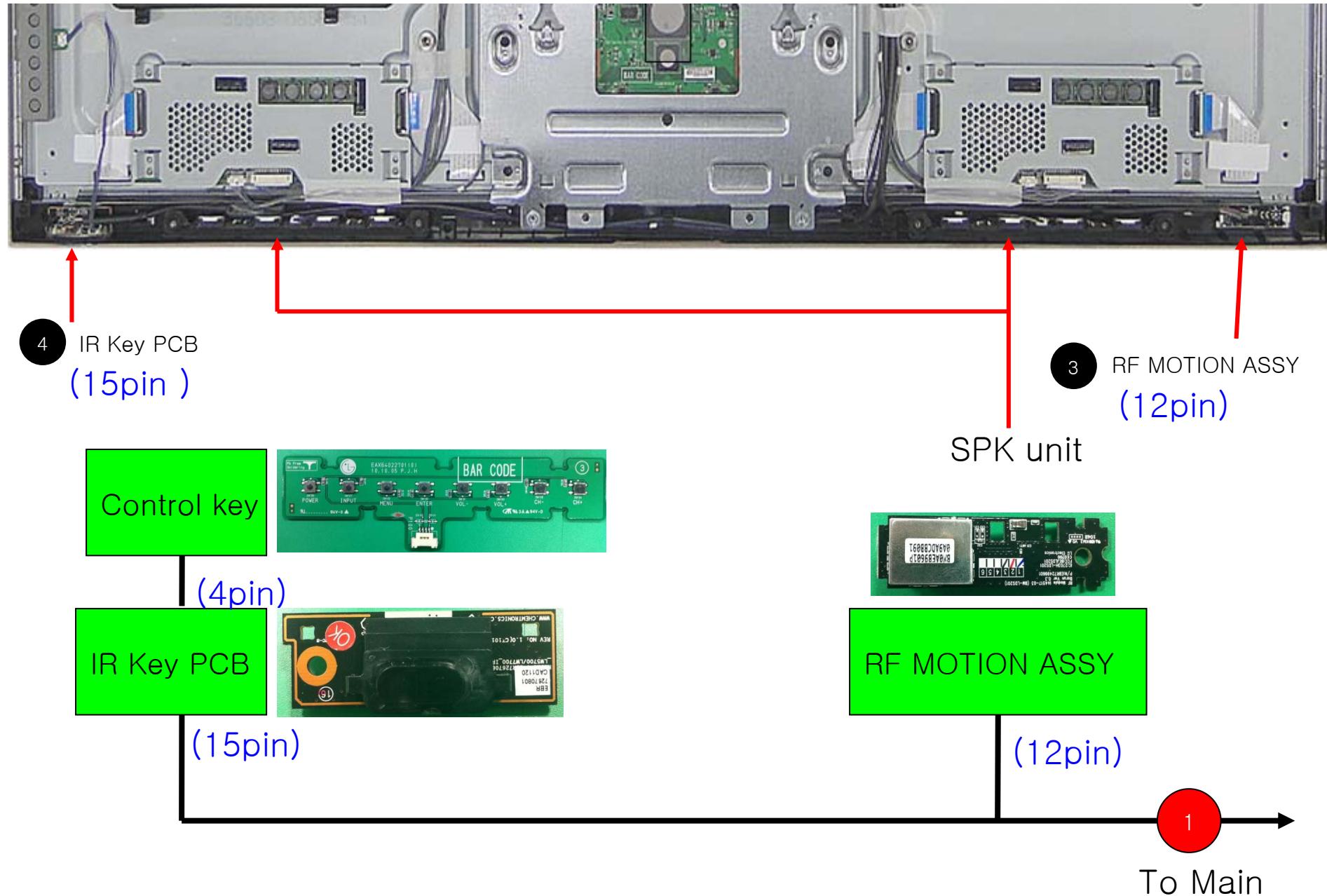


- 1 Main PCB
- 2 LED driver
- 3 RF MOTION ASSY
- 4 IR Key PCB
- 5 Control key
- 6 T-CON ASSY
- 7 PSU

[Cables]

- 1 Main / PSU cable
- 2 Main / Module LVDS cable 51PIN
- 3 LED driver / PSU
- 4 T-CON to Module 80pin FFC
- 5 Multi-cable:
IR+MOTION +SPK
- 6 WOOFER SPK CABLE
- 7 Local dimming cable 8pin

Interconnection – sub PCB(LW770 Series)



Contents of LCD TV Standard Repair Process

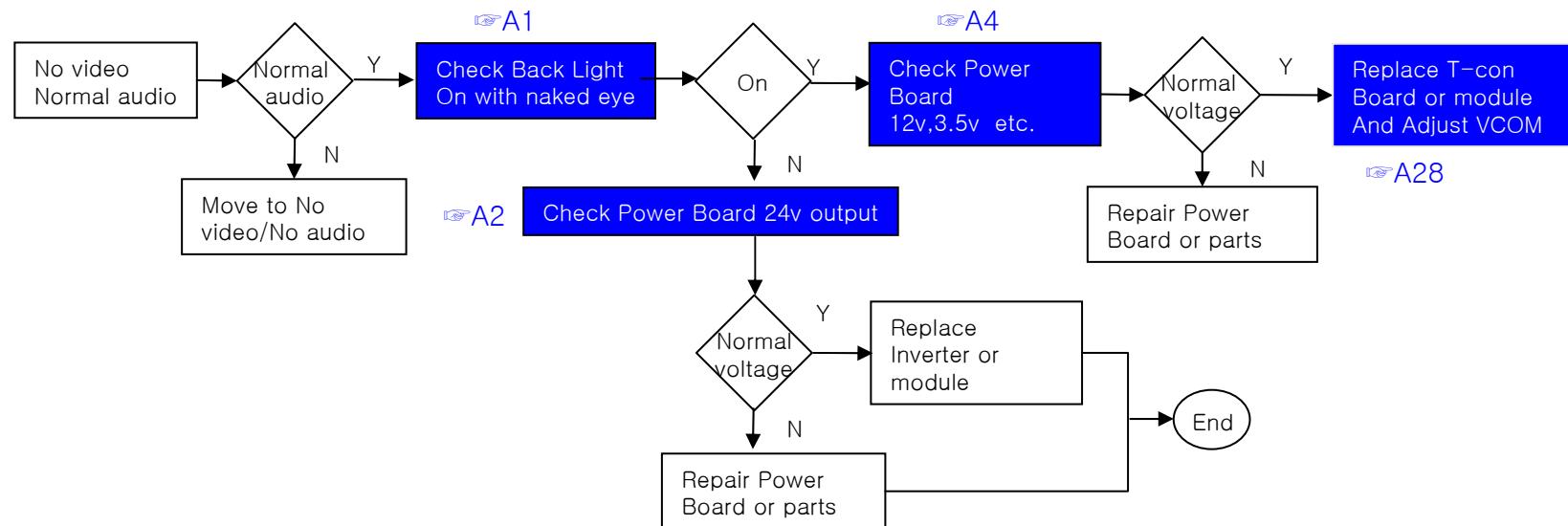
No.	Error symptom (High category)	Error symptom (Mid category)	Page	Remarks
1	A. Video error	No video/Normal audio	1	
2		No video/No audio	2	
3		Video error, video lag/stop, fail tuning	3, 4	
4		Color error	5	
5		Vertical/Horizontal bar, residual image, light spot, external device color error	6	
6	B. Power error	No power	7	
7		Off when on, off while viewing, power auto on/off	8	
8	C. Audio error	No audio/Normal video	9	
9		Wrecked audio/discontinuation/noise	10	
10	D. Function error	No response in remote controller, key error, recording error, memory error	11	
11		External device recognition error	12	
12	E. Noise	Circuit noise, mechanical noise	13	
13	F. Exterior error	Exterior defect	14	

First of all, Check whether there is SVC Bulletin in GCSC System for these model.

Standard Repair Process

LCD TV	Error symptom	A. Video error	Established date	2010.12.14	
		No video/ Normal audio	Revised date		1/14

First of all, Check whether all of cables between board is inserted properly or not.
(Main B/D↔ Power B/D, LVDS Cable, Speaker Cable, IR B/D Cable, ...)



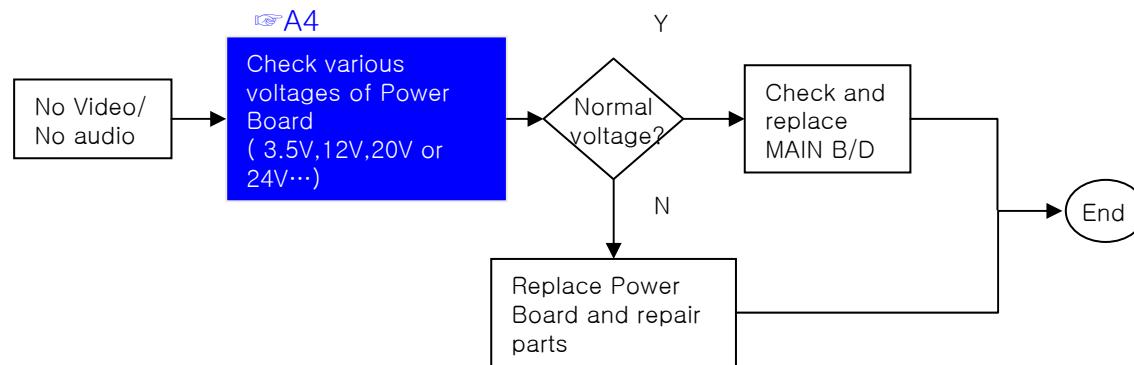
※Precaution A7 & A3

Always check & record S/W Version and White Balance value before replacing the Main Board

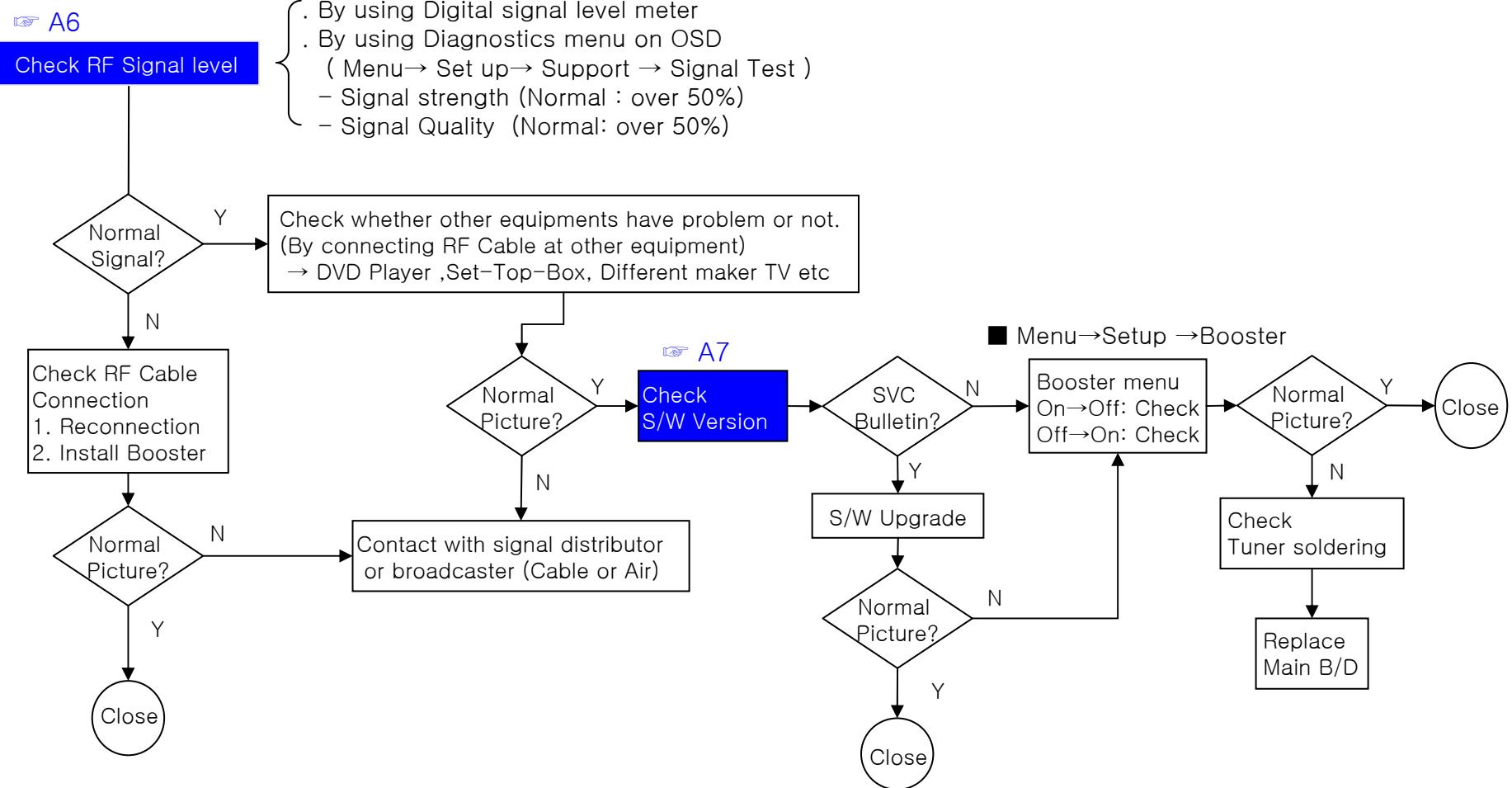
Replace Main Board → Re-enter White Balance value

Standard Repair Process

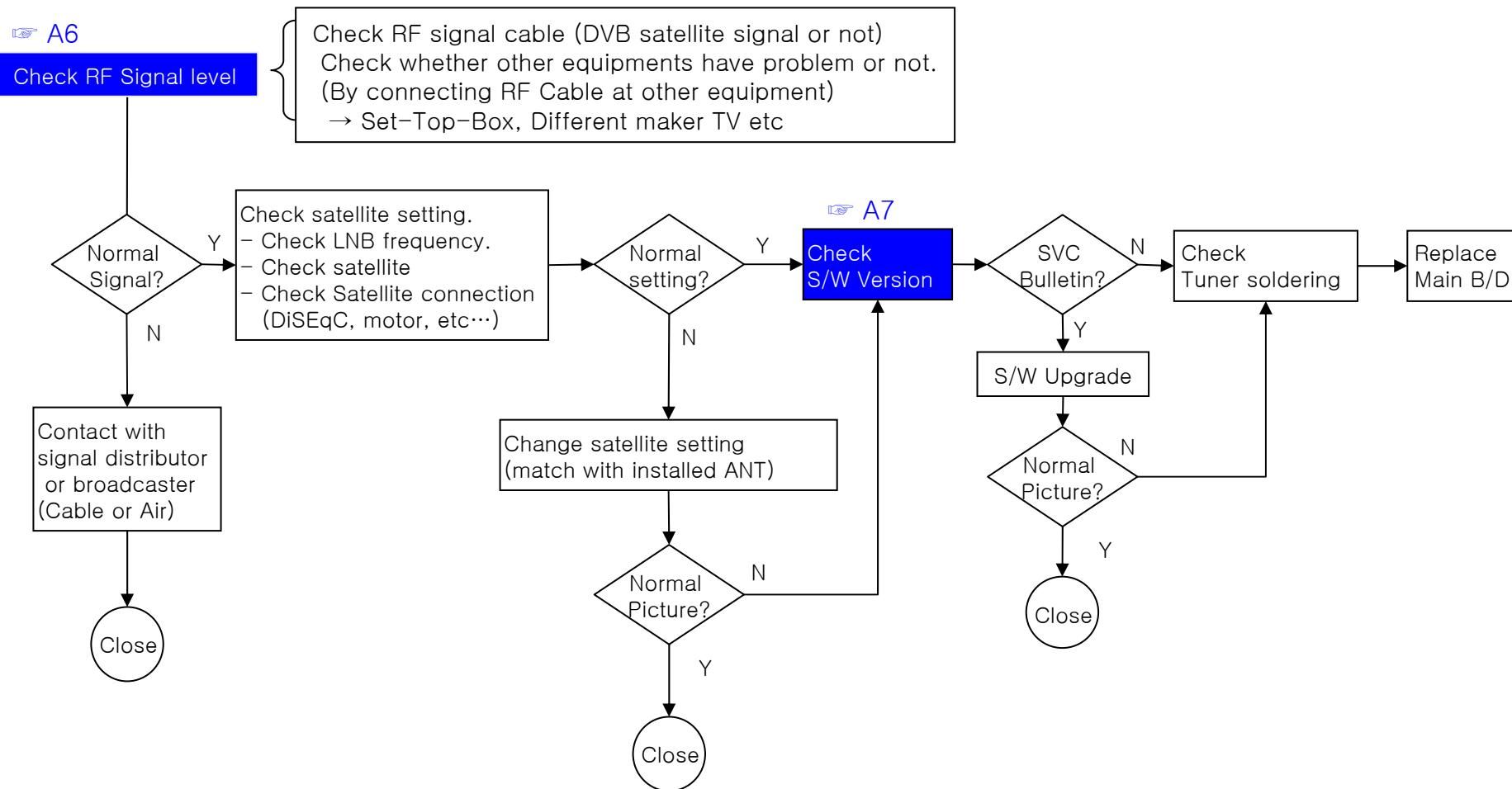
LCD TV	Error symptom	A. Video error	Established date	2010.12.14	
		No video/ No audio	Revised date		2/14



LCD TV	Error symptom	A. Picture Problem	Established date	2010.12.1	
		Picture broken/ Freezing	Revised date	4	3/14

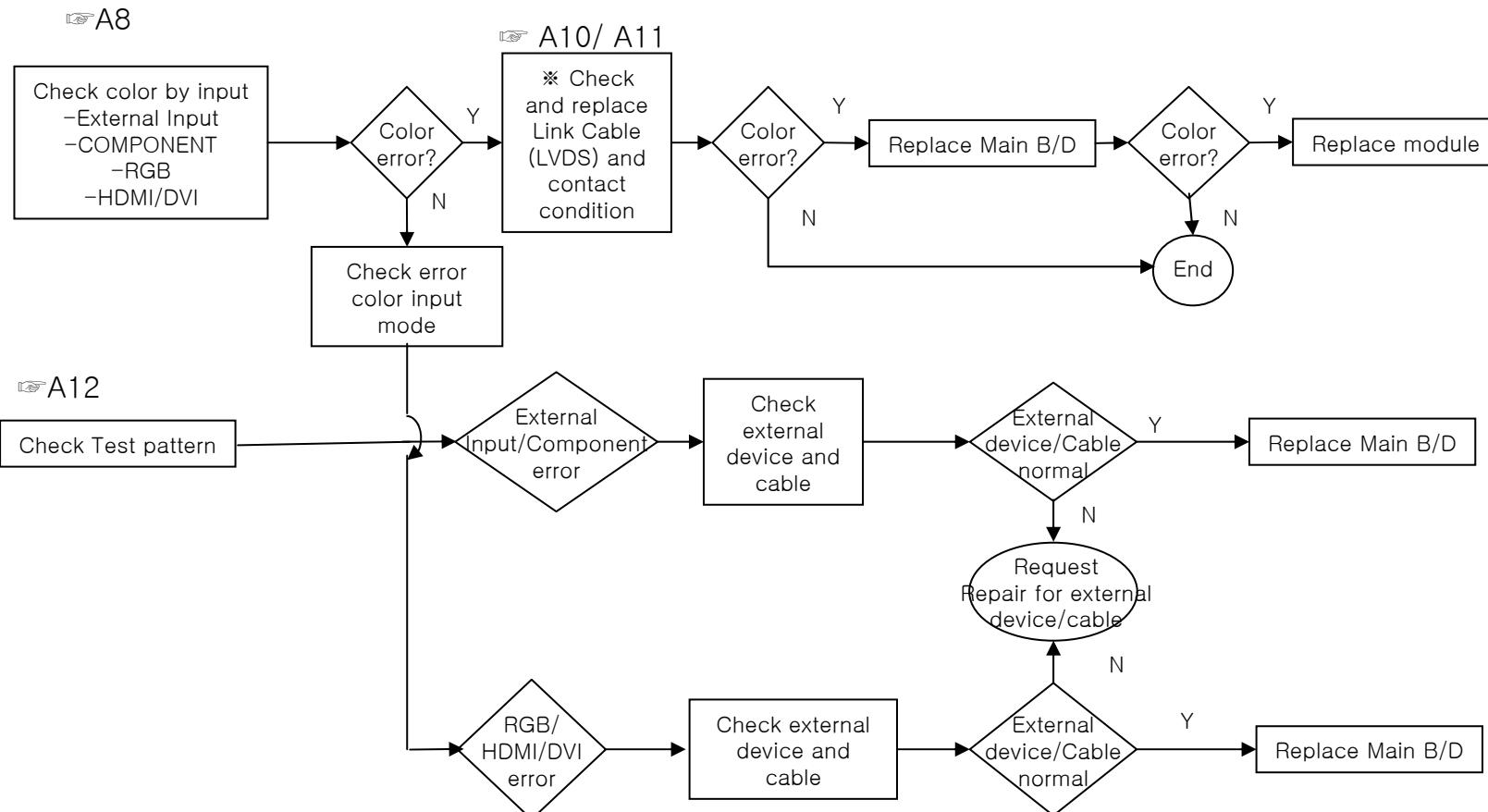


LCD TV	Error symptom	A. Picture Problem (DVB-S/S2)	Established date	2010.12.14	
		Tuning fail, Picture broken/ Freezing	Revised date		4/14



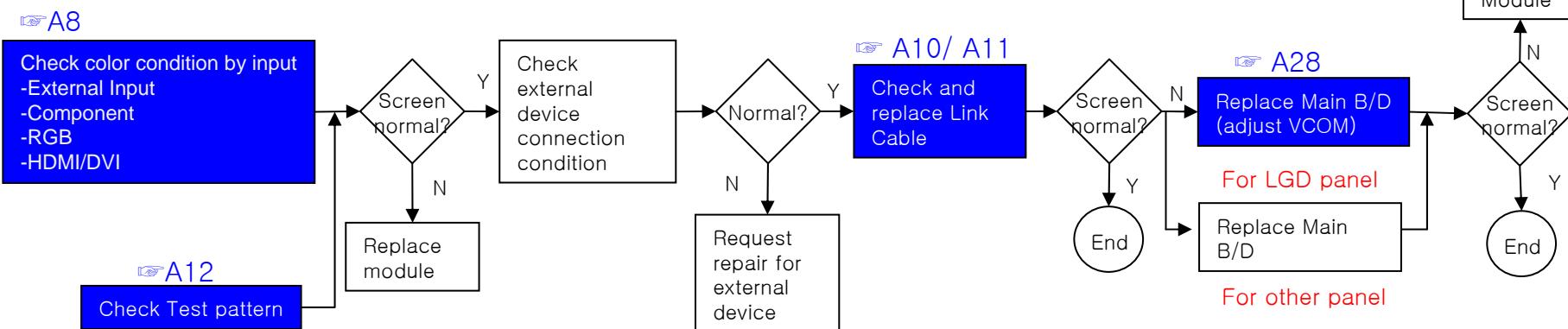
Standard Repair Process

LCD TV	Error symptom	A. Video error	Established date	2010.12.14	
		Color error	Revised date		5/14

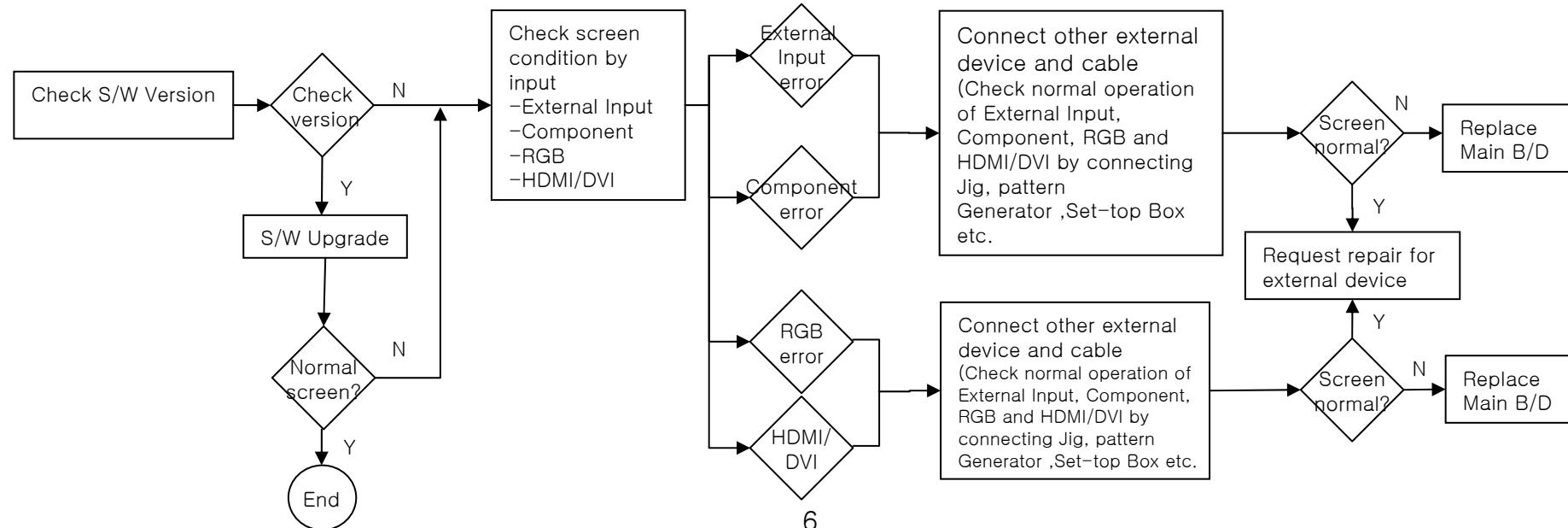


Standard Repair Process					
LCD TV	Error symptom	A. Video error	Established date	2010.12.14	
		Vertical / Horizontal bar, residual image, light spot, external device color error	Revised date		6/14

Vertical/Horizontal bar, residual image, light spot

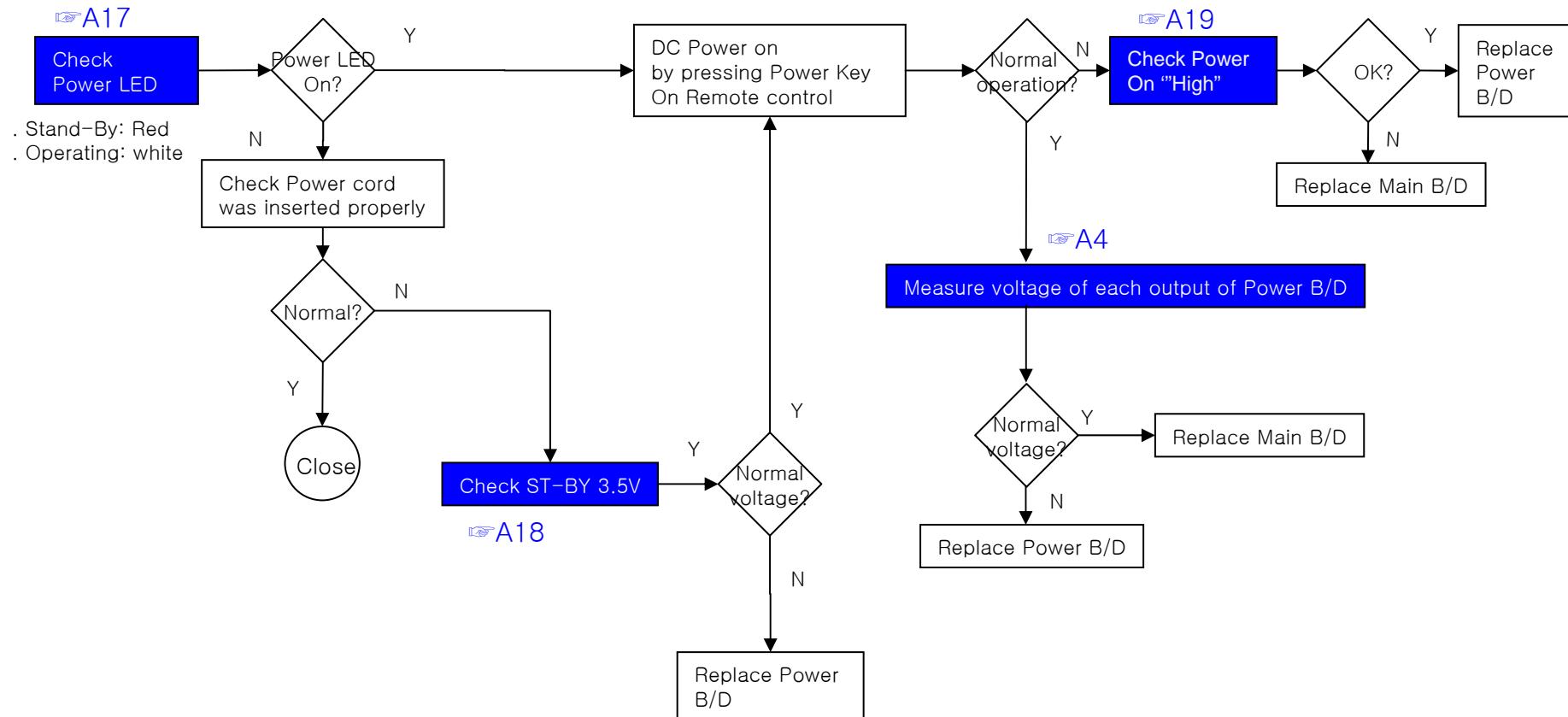


External device screen error–Color error

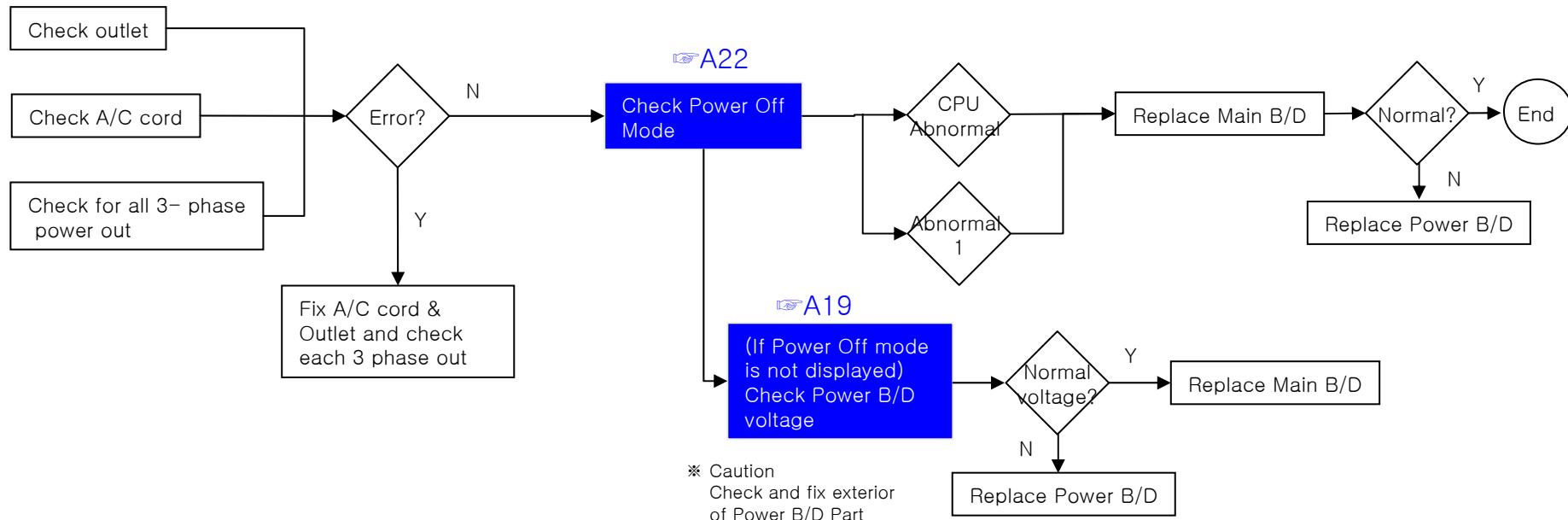


Standard Repair Process

LCD TV	Error symptom	B. Power error	Established date	2010.12.14	
		No power	Revised date		7/14



LCD TV	Error symptom	B. Power error	Established date	2010.12.14	
		Off when on, off while viewing, power auto on/off	Revised date		8/14

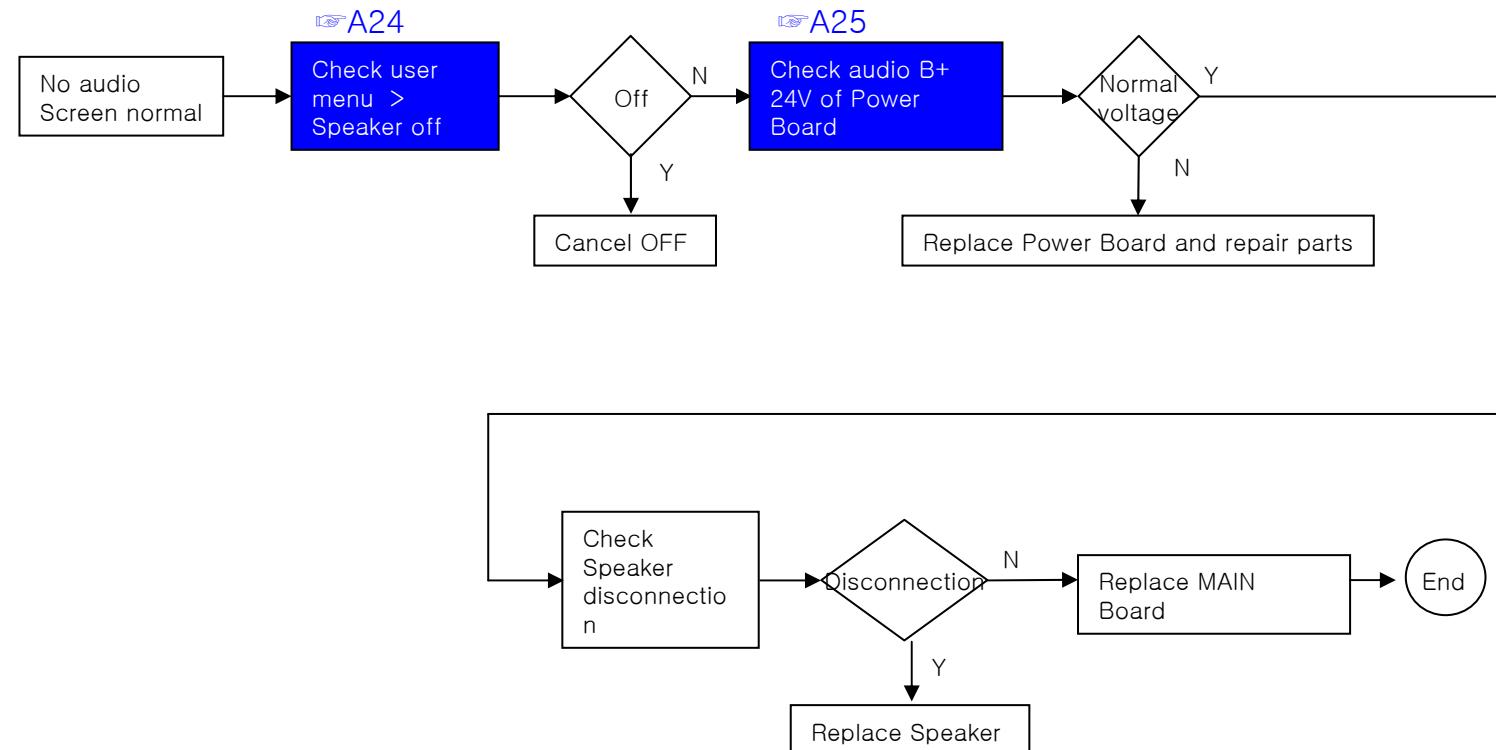


- * Please refer to the all cases which can be displayed on power off mode.

Status	Power off List	Explanation
Normal	"POWEROFF_REMOTEKEY"	Power off by REMOTE CONTROL
	"POWEROFF_OFFTIMER"	Power off by OFF TIMER
	"POWEROFF_SLEEPSHUTTER"	Power off by SLEEP TIMER
	"POWEROFF_INSTOP"	Power off by INSTOP KEY
	"POWEROFF_AUTOOFF"	Power off by AUTO OFF
	"POWEROFF_ONTIMER"	Power off by ON TIMER
	"POWEROFF_RS232C"	Power off by RS232C
	"POWEROFF_RESREC"	Power off by Reserved Record
	"POWEROFF_RECEND"	Power off by End of Recording
	"POWEROFF_SWDOWN"	Power off by S/W Download
Abnormal	"POWEROFF_ABNORMAL1"	Power off by abnormal status except CPU trouble
	"POWEROFF_CPUABNORMAL"	Power off by CPU Abnormal

Standard Repair Process

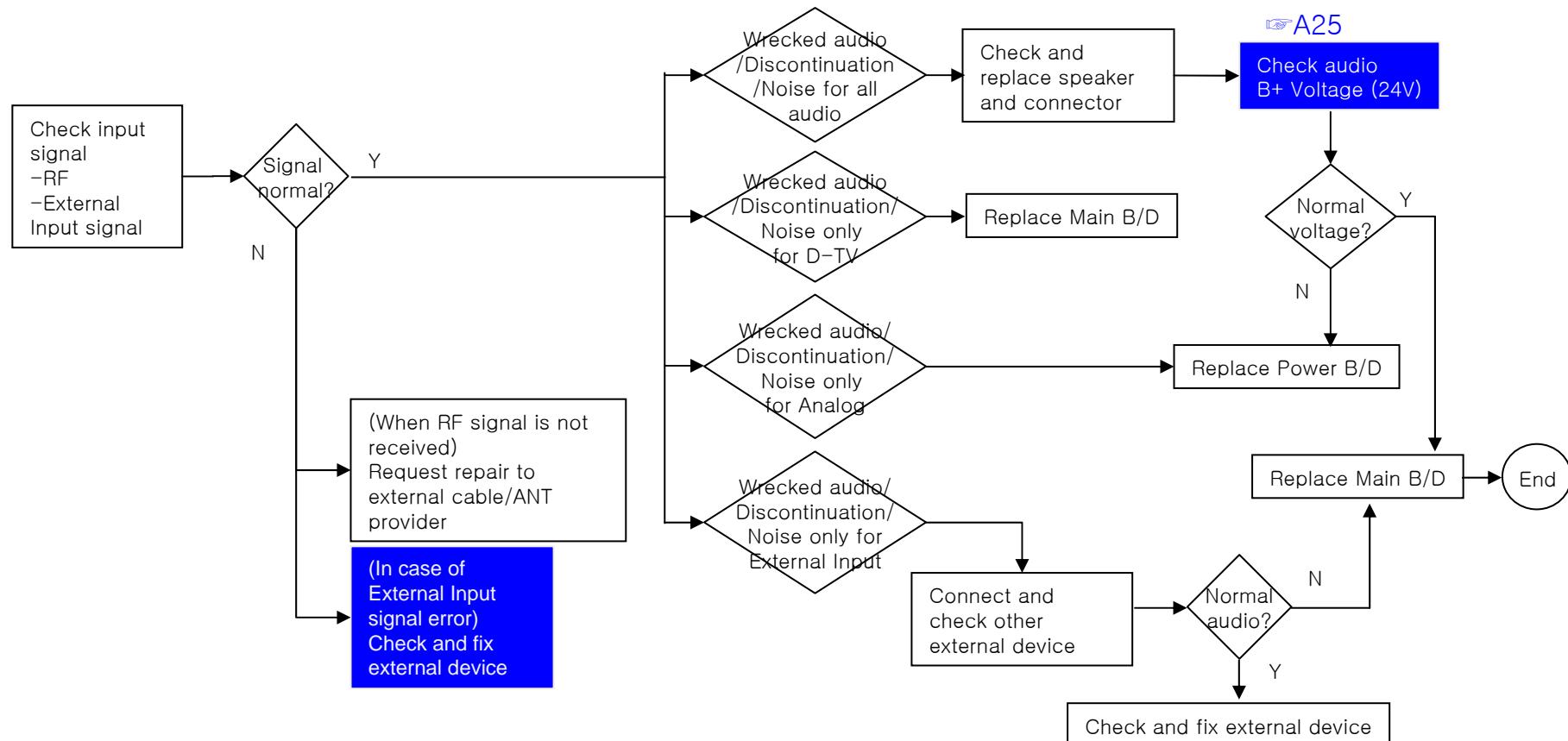
LCD TV	Error symptom	C. Audio error	Established date	2010.12.14	
		No audio/ Normal video	Revised date		9/14



Standard Repair Process

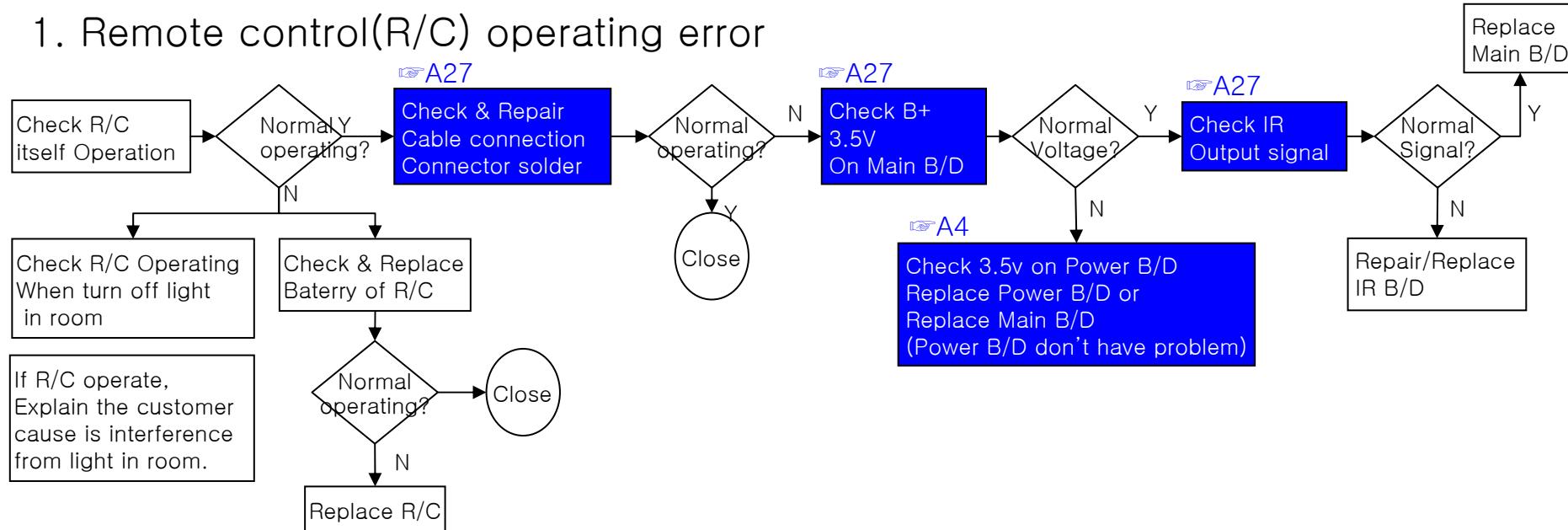
LCD TV	Error symptom	C. Audio error	Established date	2010.12.14	
		Wrecked audio/ discontinuation/noise	Revised date		10/14

→ abnormal audio/discontinuation/noise is same after “Check input signal” compared to No audio



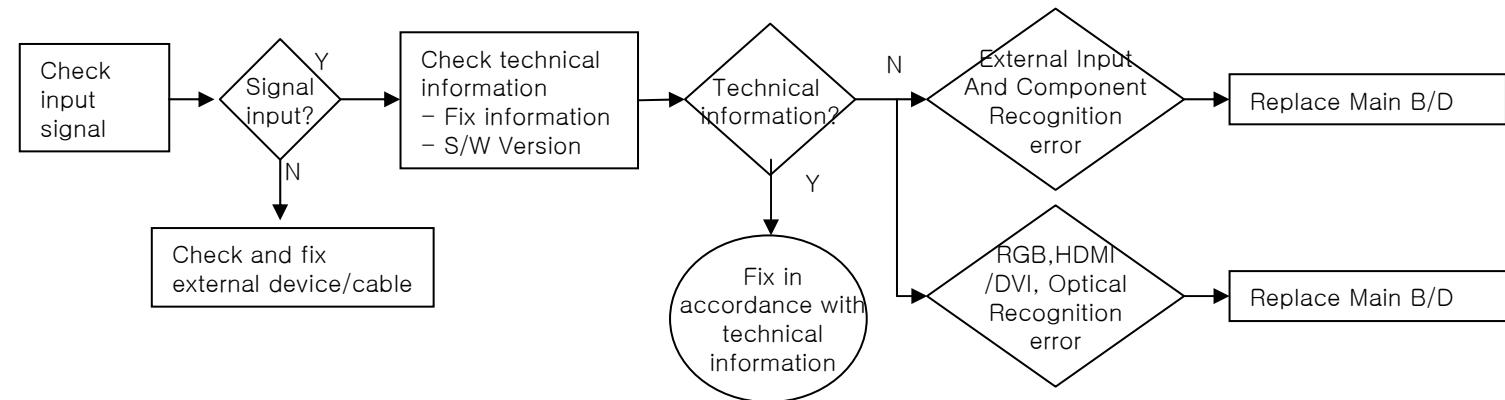
LCD TV	Error symptom	D. General Function Problem	Established date	2010.12.14	
		Remote control & Local switch checking	Revised date		11/14

1. Remote control(R/C) operating error



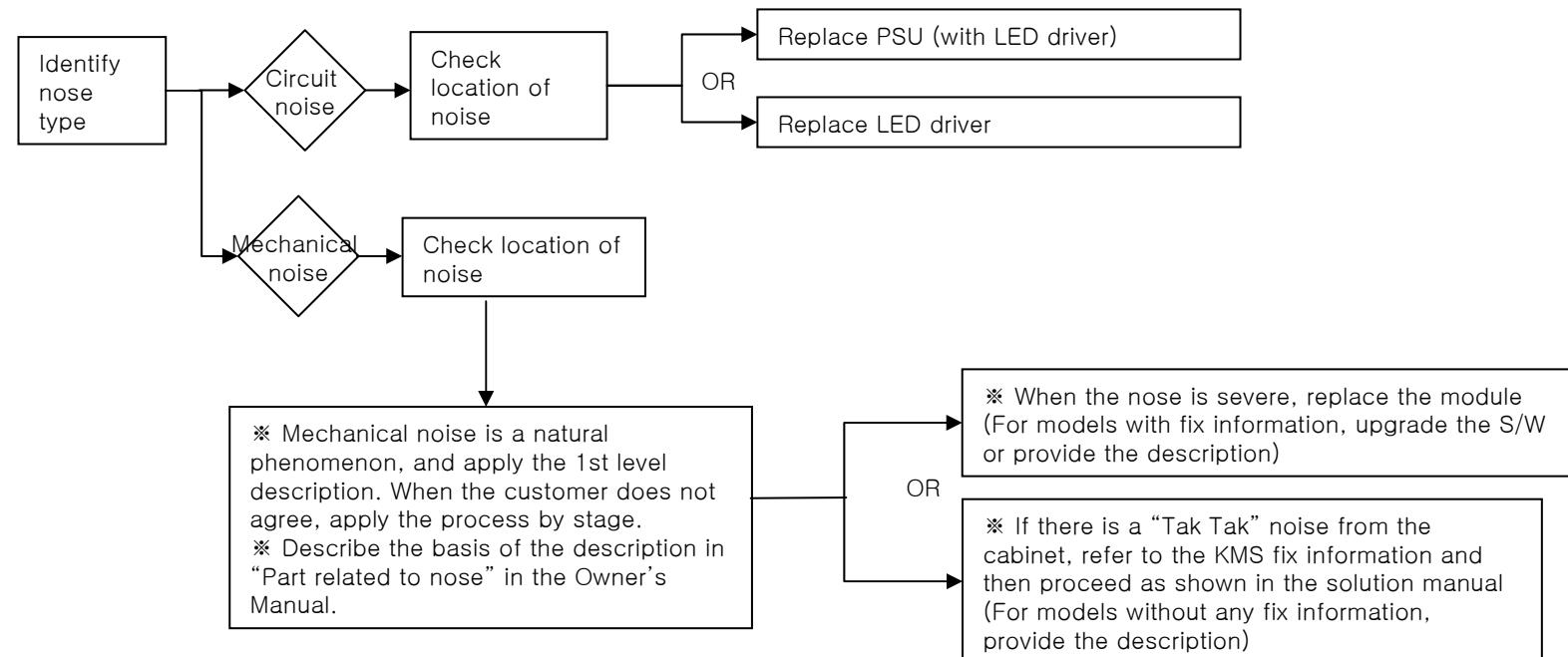
Standard Repair Process

LCD TV	Error symptom	D. Function error	Established date	2010.12.14	
		External device recognition error	Revised date		12/14



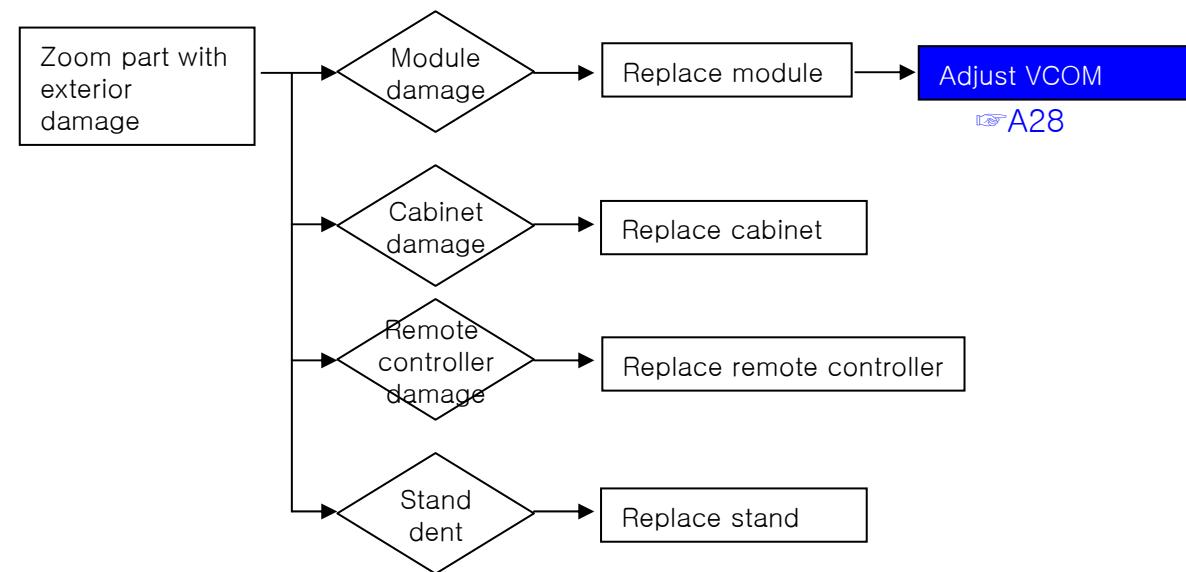
Standard Repair Process

LCD TV	Error symptom	E. Noise	Established date	2010.12.14	
		Circuit noise, mechanical noise	Revised date		13/14



Standard Repair Process

LCD TV	Error symptom	F. Exterior defect	Established date	2010.12.14	
		Exterior defect	Revised date		14/14



Contents of LCD TV Standard Repair Process Detail Technical Manual

No.	Error symptom	Content	Page	Remarks
1	A. Video error_ No video/Normal audio	Check LCD back light with naked eye	A1	
2		LED driver B+ 24V measuring method	A2	
3		Check White Balance value	A3	
4		Power Board voltage measuring method	A4	
6	A. Video error_ No video/Video lag/stop	TUNER input signal strength checking method	A6	
7		LCD-TV Version checking method	A7	
9	A. Video error_Color error	LCD TV connection diagram	A8	
10		Tuner Checking Part	A9	
11		Check Link Cable (LVDS) reconnection condition	A10 A11	
12		Adjustment Test pattern - ADJ Key	A12	
13	A. Video error_Vertical/Horizontal bar, residual image, light spot	LCD TV connection diagram	A8	
14		Check Link Cable (LVDS) reconnection condition	A10 A11	A10 : LVDS A11 : Driver b'd
15		Adjustment Test pattern - ADJ Key	A12	
16	<Appendix> Defected Type caused by T-Con/ Inverter/ Module	Exchange T-Con Board (1)	A-1/5	
17		Exchange T-Con Board (2)	A-2/5	
18		Exchange LED driver Board (PSU)	A-3/5	
19		Exchange Module itself (1)	A-4/5	
20		Exchange Module itself (2)	A-5/5	

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Contents of LCD TV Standard Repair Process Detail Technical Manual

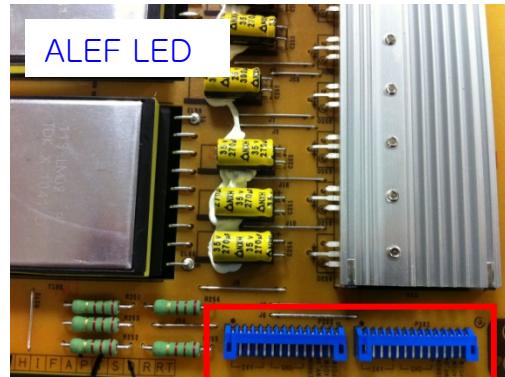
Continued from previous page

No.	Error symptom	Content	Page	Remarks
21	B. Power error_No power	Check front display LED	A17	
22		Check power input Voltage & ST-BY 5V	A18	
23		Checking method when power is ON	A19	
24		POWER BOARD voltage measuring method	A4	
25				
26	B. Power error_Off when on, off while viewing	POWER OFF MODE checking method	A22	
27	B. Power error_Off when on, off while viewing	POWER BOARD PIN voltage checking method	A19	
28	C. Audio error_No audio/Normal video	Checking method in menu when there is no audio	A24	
29		Voltage and speaker checking method when there is no audio	A25	
30	C. Audio error_Wrecked audio/discontinuation	Voltage and speaker checking method in case of audio error	A25	
31	D. Function error_No response in remote controller, key error	Remote controller operation checking method	A27	
32	D. VCOM Adjustment	Sequence of the Vcom adjustment	A28	

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2010.12.14	
	Content	LED driver B+ 24V measuring method	Revised date		A2

Check the DC 24V, 12V, 3.5V and Inverter on



P202	
1~5	24V
6~10	GND
11	Error
12	Inverter ON
13	A-dim
14	P-dim

P203	
1~5	24V
6~10	GND
11	Error
12	Inverter ON
13	A-dim
14	P-dim

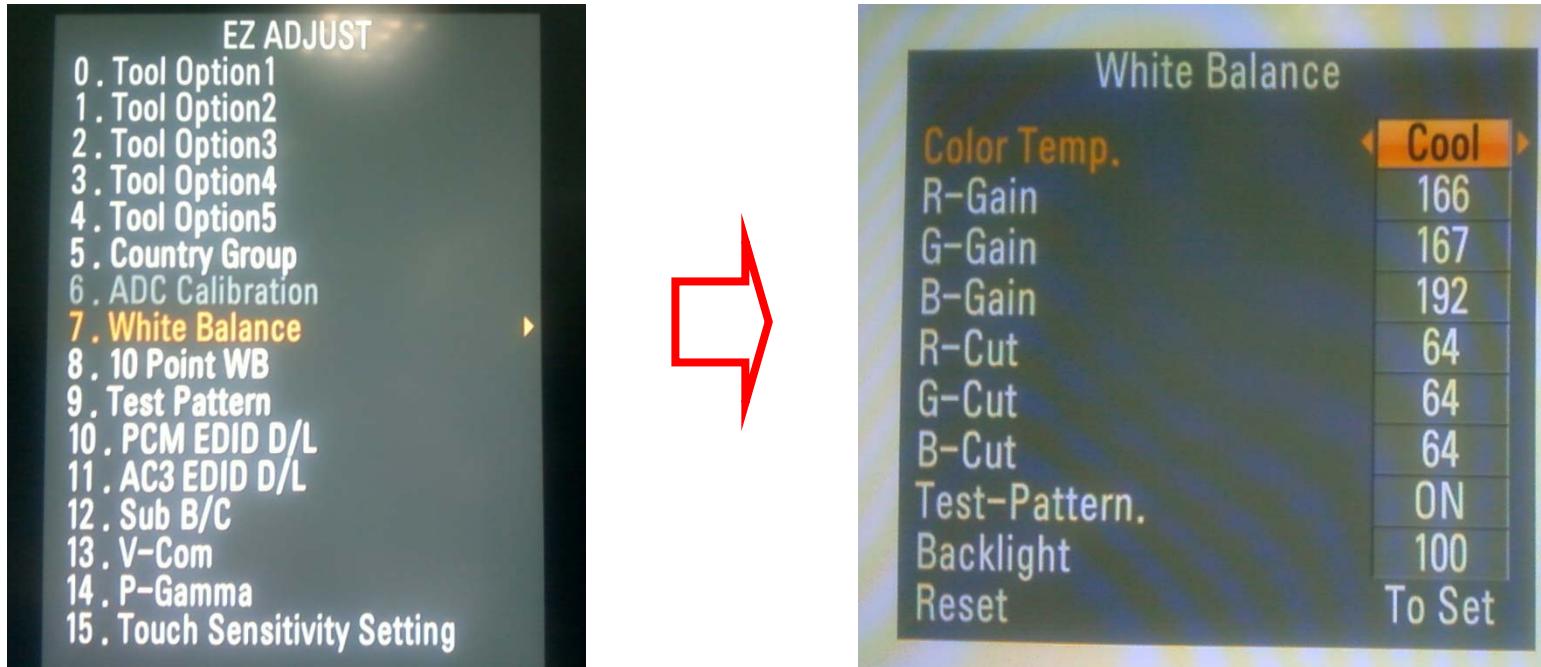


A2

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2010.12.14	
	Content	Check White Balance value	Revised date		A3

<ALL MODELS>

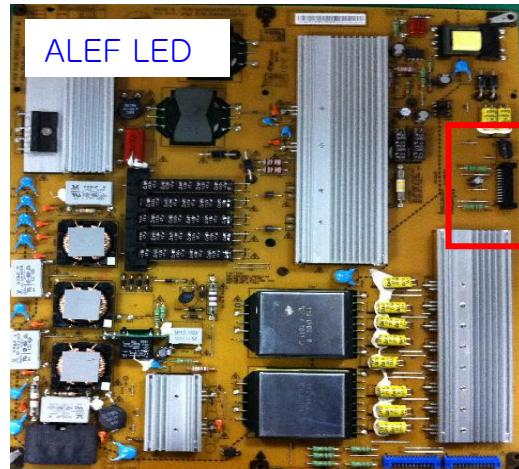


Entry method

1. Press the ADJ button on the remote controller for adjustment.
2. Enter into White Balance of item 7.
3. After recording the R, G, B (GAIN, Cut) value of Color Temp (Cool/Medium/Warm), re-enter the value after replacing the MAIN BOARD.

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_No video/ Audio	Established date	2010.12.14	
	Content	Power Board voltage measuring method	Revised date		A4



Check the DC 24V, 12V, 3.5V.

24 Pin (Power Board ↔ Main Board) - 공통			
SMAW200-H24S (YEONHO)			
1	Power on	2	20V (24V)
3	20V (24V)	4	20V (24V)
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	GND
17	12V	18	Inverter On/off
19	12V	20	Lamp : A-Dim LED : N.C
21	12V	22	PWM Dim #1
23	N.C • Lamp SCANNING Model : PWM Dim #2	24	Error-out

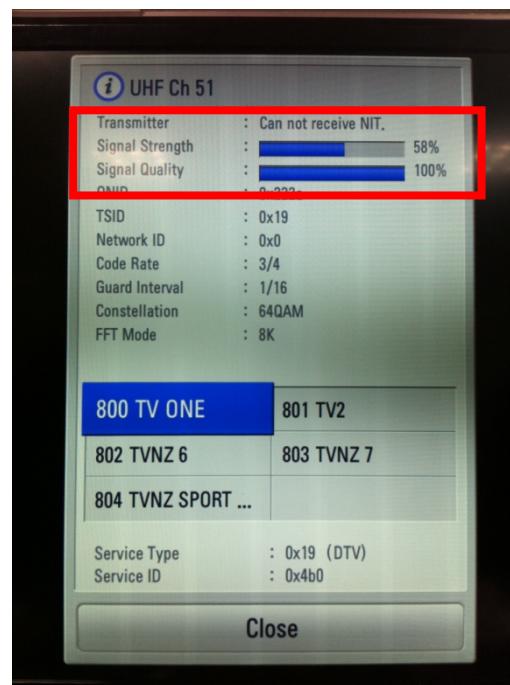
Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Video error, video lag/stop	Established date	2010.12.14	
	Content	TUNER input signal strength checking method	Revised date		A6

<ALL MODELS>



MENU → Set up → support → signal test
→ select channel



When the signal is strong, use the attenuator (-10dB, -15dB, -20dB etc.)

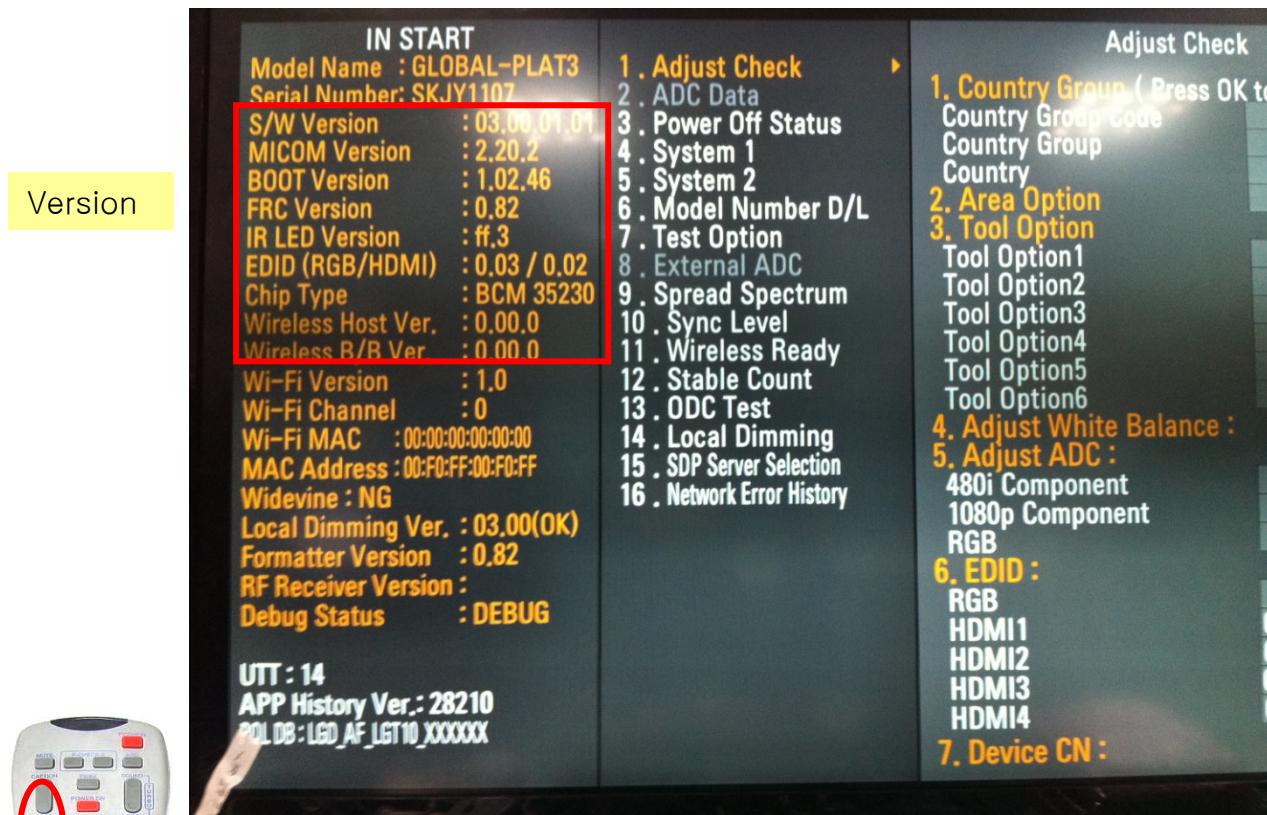


Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Video error, video lag/stop	Established date	2010.12.14	
	Content	LCD-TV Version checking method	Revised date		A7

<ALL MODELS>

1. Checking method for remote controller for adjustment



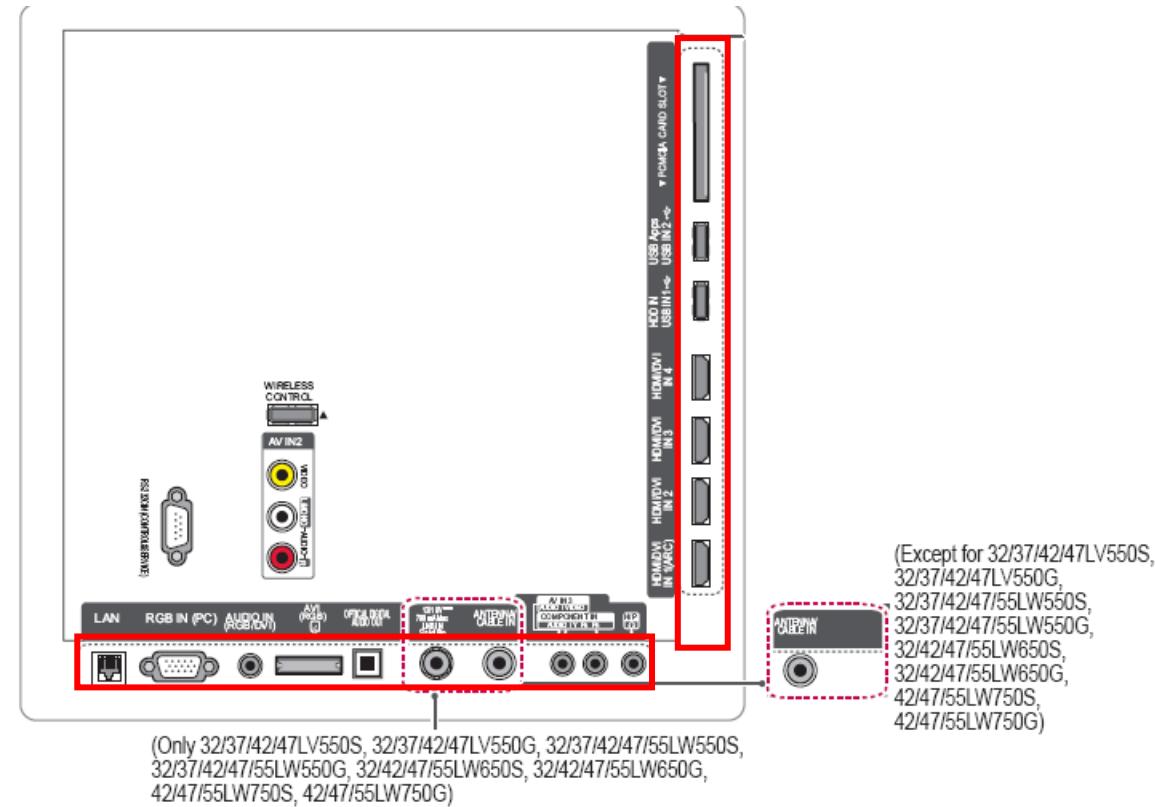
Press the IN-START with the remote controller for adjustment

A7

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error _Vertical/Horizontal bar, residual image, light spot	Established date	2010.12.14	
	Content	LCD TV connection diagram (1)	Revised date		A8

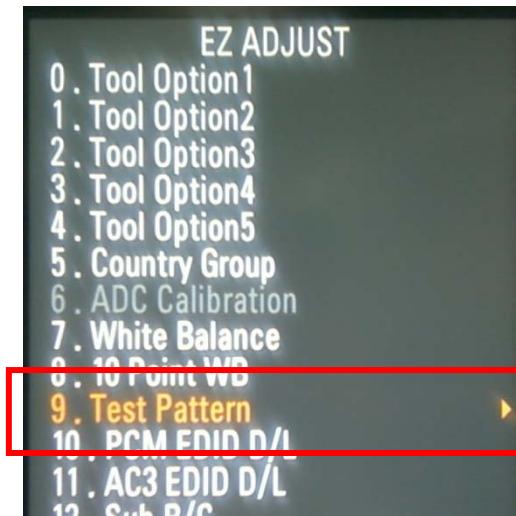
<ALL MODELS>



As the part connecting to the external input, check the screen condition by signal

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Color error	Established date	2010.12.14	
	Content	Adjustment Test pattern – ADJ Key	Revised date		A12



You can view 6 types of patterns using the ADJ Key

Checking item : 1. Defective pixel 2. Residual image 3. MODULE error (ADD-BAR,SCAN BAR..)
4. Video error (Classification of MODULE or Main-B/D!)

A12

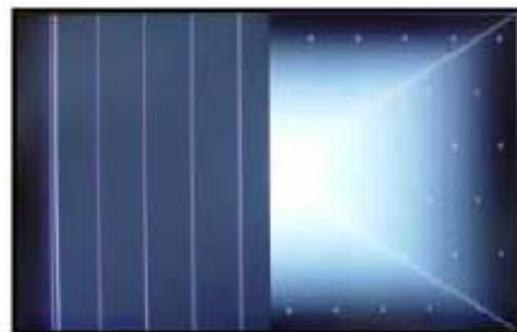
Appendix : Exchange T-Con Board (1)



Solder defect, CNT Broken



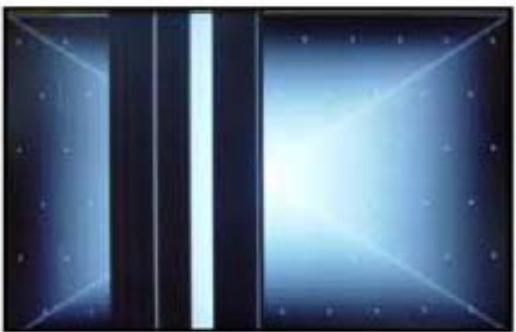
Solder defect, CNT Broken



Solder defect, CNT Broken



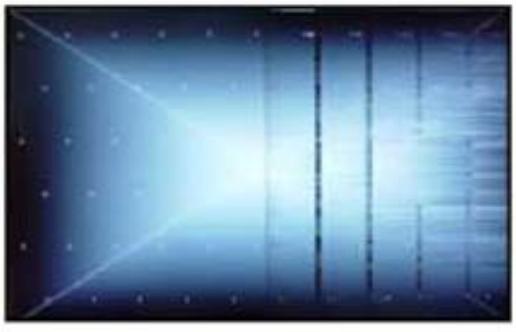
Solder defect, CNT Broken



Solder defect, CNT Broken



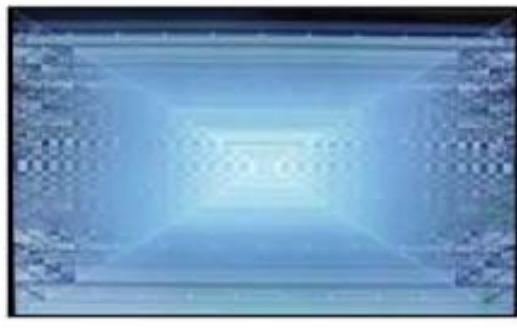
Abnormal Power Section



Solder defect, Short/Crack

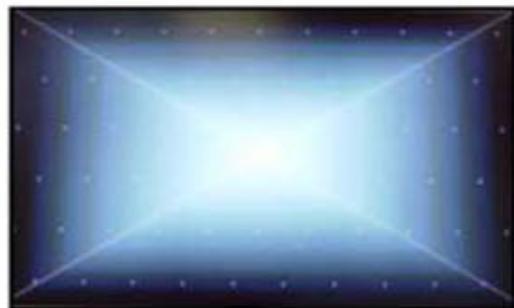


Abnormal Power Section



Solder defect, Short/Crack

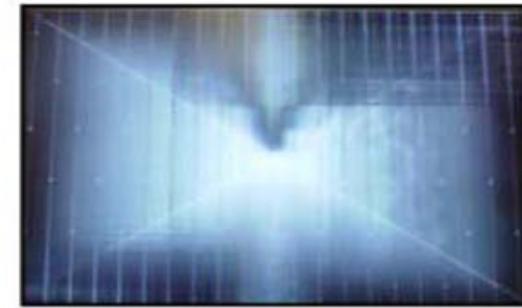
Appendix : Exchange T-Con Board (2)



Abnormal Power Section



Abnormal Power Section



Solder defect, Short/Crack



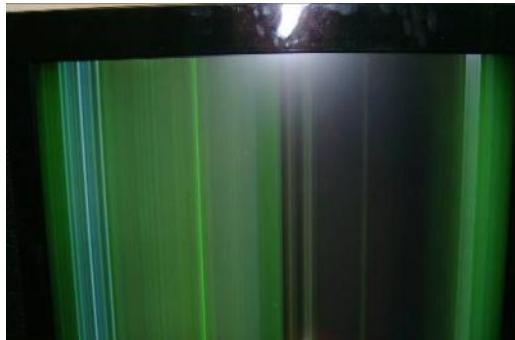
Solder defect, Short/Crack



Fuse Open, Abnormal power section



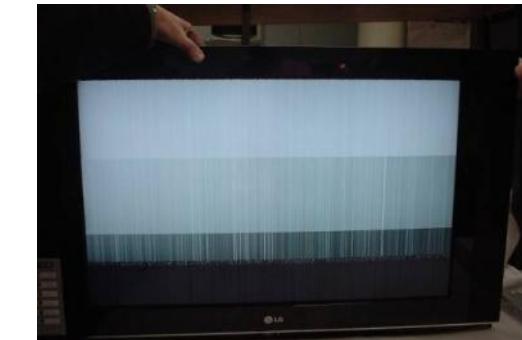
Abnormal Display



GRADATION



Noise



GRADATION

Appendix : Exchange PSU(LED driver)



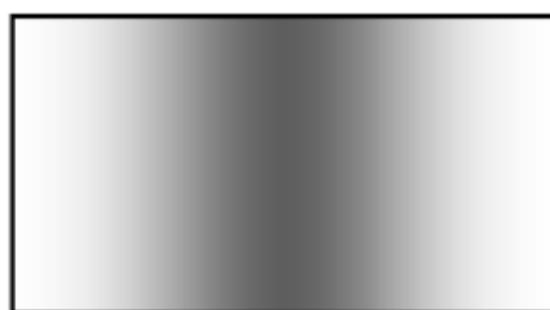
No Light



Dim Light



Dim Light



Dim Light



No picture/Sound Ok

A – 3/5

Appendix : Exchange the Module (1)



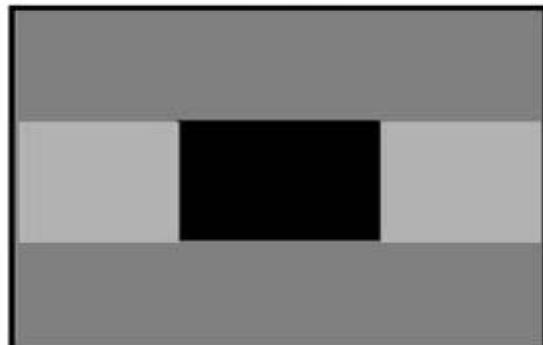
Panel Mura, Light leakage



Panel Mura, Light leakage



Press damage



Crosstalk



Press damage



Crosstalk

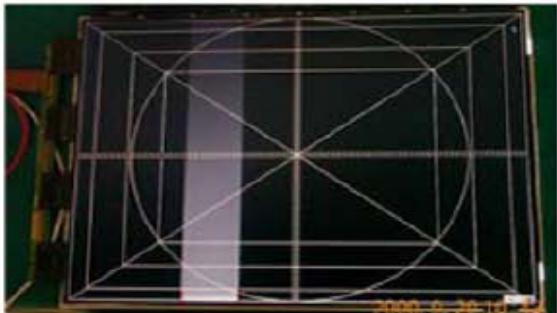


Press damage

Un-repairable Cases

In this case please exchange the module.

Appendix : Exchange the Module (2)



Vertical Block
Source TAB IC Defect



Vertical Line
Source TAB IC Defect



Vertical Block
Source TAB IC Defect



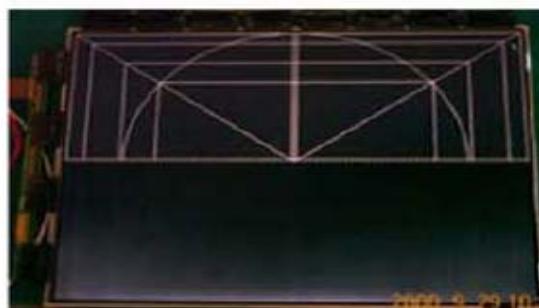
Horizontal Block
Gate TAB IC Defect



Horizontal Block
Gate TAB IC Defect



Horizontal line
Gate TAB IC Defect



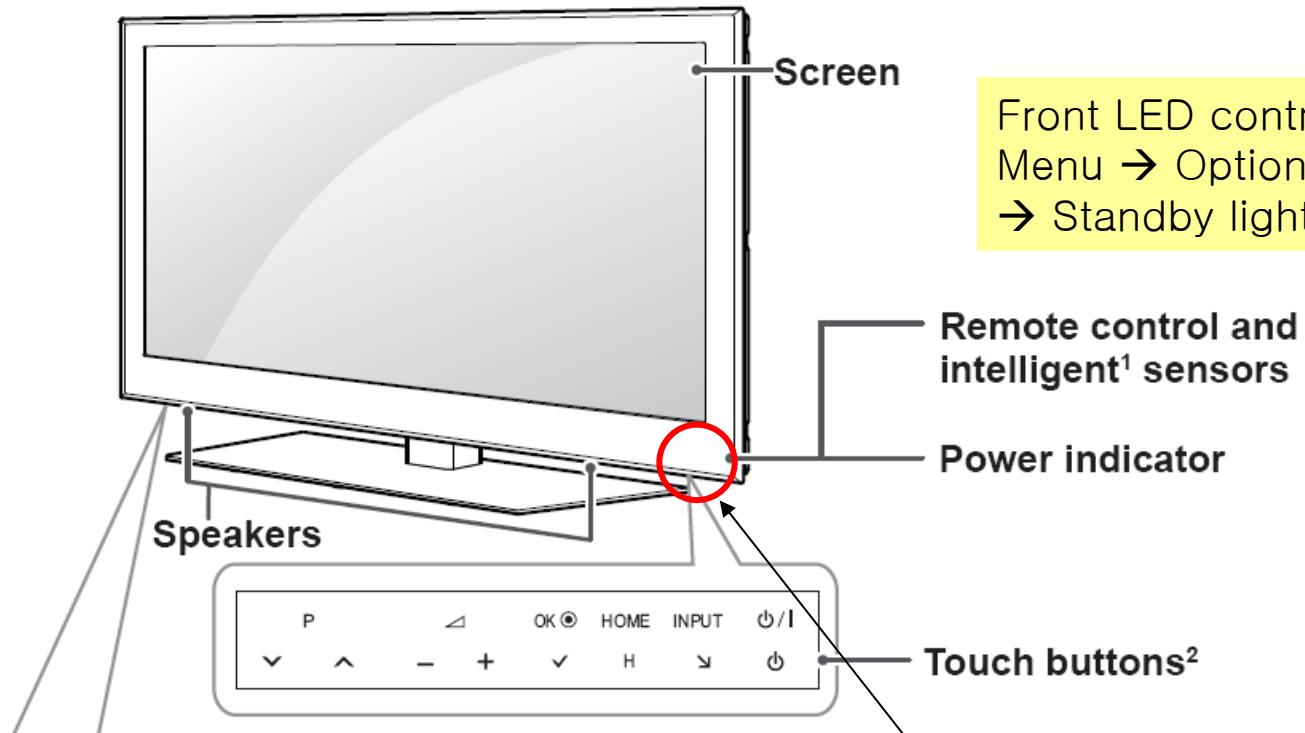
Horizontal Block
Gate TAB IC Defect

Un-repairable Cases

In this case please exchange the module.

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _No power	Established date	2010. 12 .14	
	Content	Check front display LED	Revised date		A17



Front LED control :
Menu → Option → Power Indicator
→ Standby light ON

Remote control and
intelligent¹ sensors

Power indicator

Touch buttons²

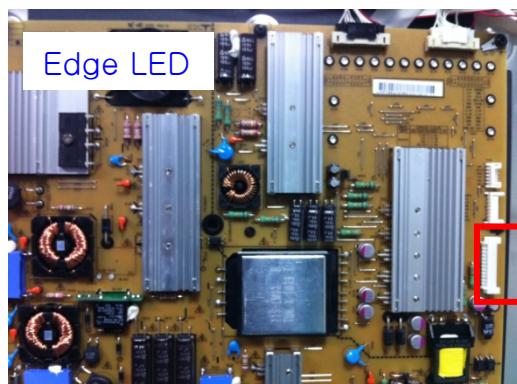
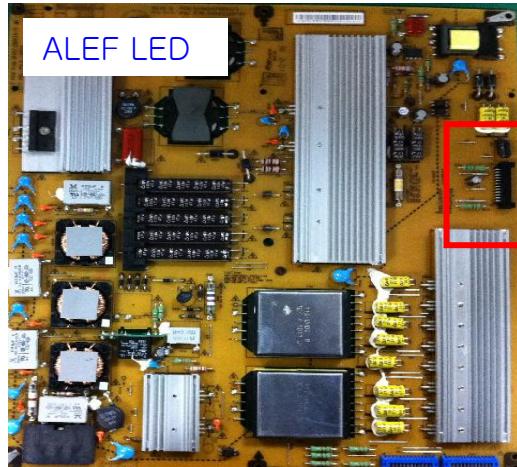
ST-BY condition: Red
Power ON condition: white

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _No power	Established date	2010. 12 .14	
	Content	Check power input voltage and ST-BY 5V	Revised date		A18

For '10 models, there is no voltage out for st-by purpose.

When st-by, only 3.5V is normally on.



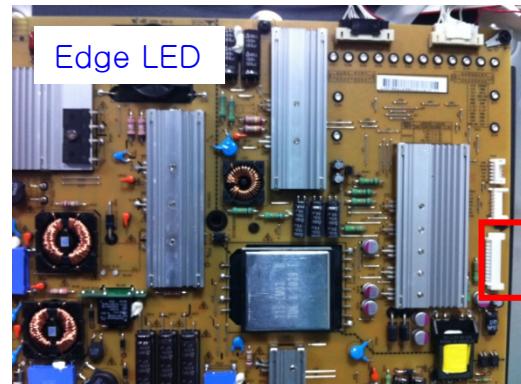
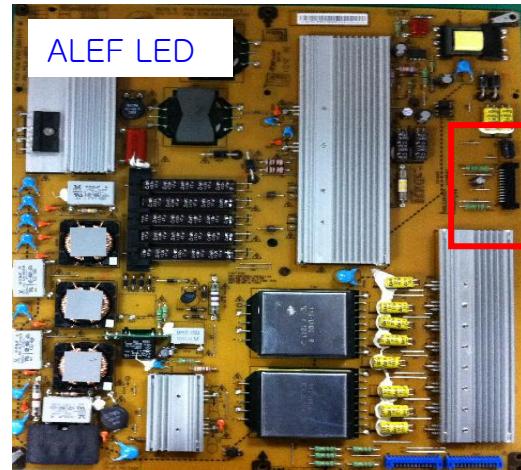
Check the DC 20V/24V, 12V, 3.5V.

24 Pin (Power Board ↔ Main Board) - 공통			
SMAW200-H24S (YEONHO)			
1	Power on	2	20V (24V)
3	20V (24V)	4	20V (24V)
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	GND
17	12V	18	Inverter On/off
19	12V	20	Lamp : A-Dim LED : N.C
21	12V	22	PWM Dim #1
23	N.C • Lamp SCANNING Model : PWM Dim #2	24	Error-out

A18

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _No power	Established date	2010. 12 .14	
	Content	Checking method when power is ON	Revised date		A19



Check “power on” pin is high

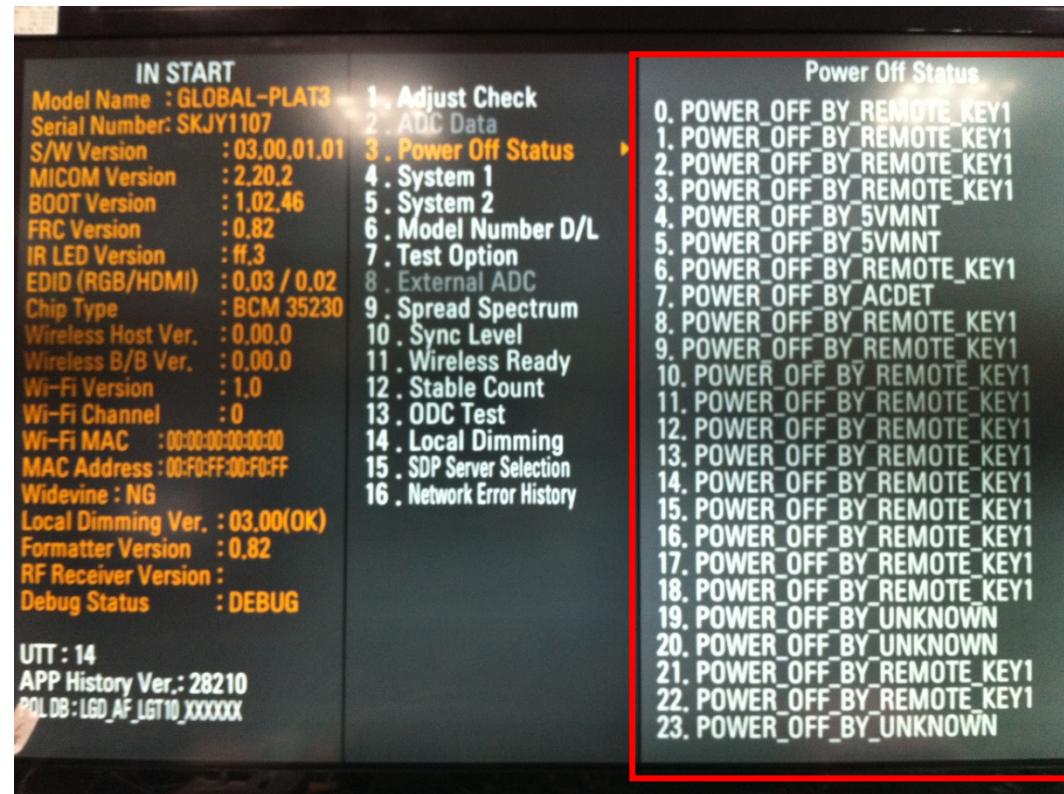
24 Pin (Power Board ↔ Main Board) - 공통			
SMAW200-H24S (YEONHO)			
1	Power on	2	20V (24V)
3	20V (24V)	4	20V (24V)
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	GND
17	12V	18	Inverter On/off
19	12V	20	Lamp : A-Dim LED : N.C
21	12V	22	PWM Dim #1
23	N.C • Lamp SCANNING Model : PWM Dim #2	24	Error-out

A19

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _Off when on, off whiling viewing	Established date	2010. 12 .14	
	Content	POWER OFF MODE checking method	Revised date		A22

<ALL MODELS>



Entry method

1. Press the IN-START button of the remote controller for adjustment
2. Check the entry into adjustment item 3

A22

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	C. Audio error_No audio/Normal video	Established date	2010. 12 .14	
	Content	Checking method in menu when there is no audio	Revised date		A24

<ALL MODELS>



Checking method

1. Press the MENU button on the remote controller.
2. Select the AUDIO function of the Menu.
3. Select TV Speaker from Off to On.

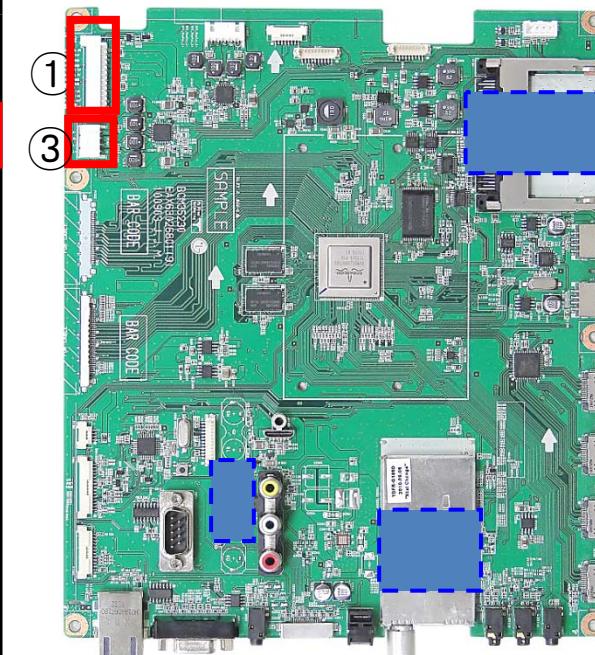
Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	C. Audio error_No audio/Normal video	Established date	2010. 12 .14	
	Content	Voltage and speaker checking method when there is no audio	Revised date		A25

<ALL MODELS>



24 Pin (Power Board ↔ Main Board) - 공통			
SMAW200-H24S (YEONHO)			
1	Power on	2	20V (24V)
3	20V (24V)	4	20V (24V)
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	GND
17	12V	18	Inverter On/off
19	12V	20	Lamp : A-Dim LED : N.C
21	12V	22	PWM Dim #1
23	N.C • Lamp SCANNING Model : PWM Dim #2	24	Error-out



Checking order when there is no audio

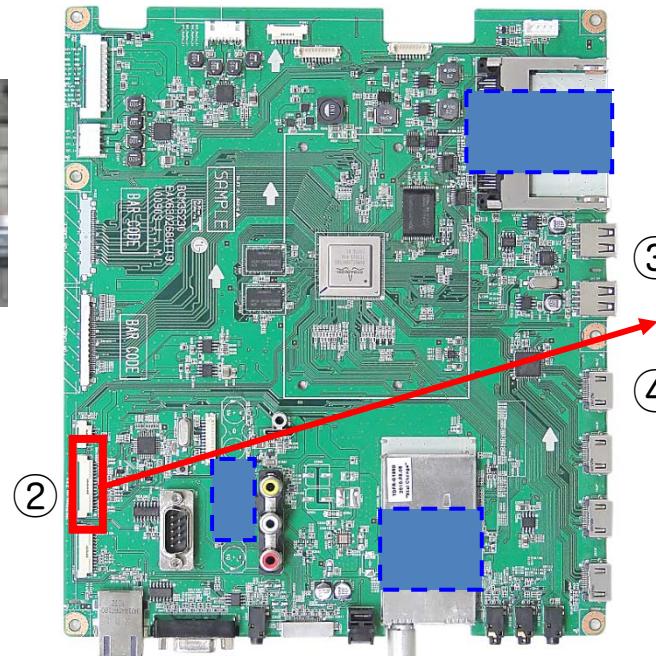
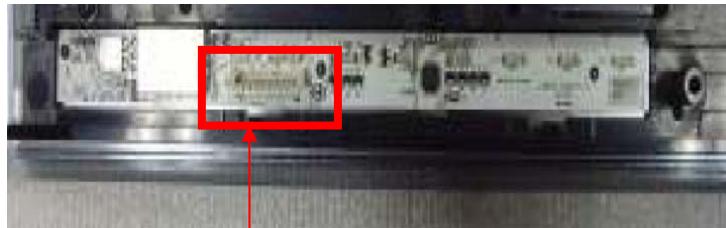
- ① Check the contact condition of or 24V connector of Main Board.
- ② Measure the 24V input voltage supplied from Power Board.
(If there is no input voltage, remove and check the connector.)
- ③ Connect the tester RX1 to the speaker terminal and if you hear the Chik Chik sound when you touch the GND and output terminal, the speaker is normal.

A25

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	D. Function error_ No response in remote controller, key error	Established date	2010. 12 .14	
	Content	Remote controller operation checking method	Revised date		A27

<ALL MODELS>



P8200	
1	SCL
2	SDA
3	GND
4	KEY1
5	KEY2
6	St 3.5V
7	GND
8	LED_B/Logo PWM
9	IR
10	GND
11	3.3V_Normal
12	LED_R/BUZZ
13	GND
14	ST_SCL
15	ST_SDA

Checking order

- 1, 2. Check IR cable condition between IR & Main board.
3. Check the st-by 3.3V on the terminal 6.
4. When checking the Pre-Amp when the power is in ON condition, it is normal when the Analog Tester needle moves slowly, and defective when it does not move at all.

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	D. VCOM Adjustment	Established date	2010. 12 .14	
	Content	Sequence of the Vcom adjustment	Revised date		A28

1. Case

- LCD module change
- T-Con board change

2. Equipment

- Service Remote controller

3. Adjust sequence

- Press the 'adj' key
- select V-COM
- As pushing the right or the left button on the remote controller, And find the V-COM value Which is no or minimized the Flicker.
(If there is no flicker at default value, Press the exit key and finish the VCOM adjustment.)
- Push the OK key to store the value. Then the message "Saving OK" is pop.
- Press the exit key to finish V-COM adjustment.

